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Report to Congress Cites Work of Prototype Group

Major accomplishments of the Prototype Aircraft Advisory Committee during its first year of operation included the approval of specifications for a local service airplane and a survey of foreign transport plane development, according to the annual report to Congress made by Charles F. Horne, Administrator of Civil Aeronautics, on the operations under Public Law 867.

The committee was appointed as a result of the enactment of this Act, which calls for the development of improved transport aircraft—particularly turbine-powered aircraft, aircraft especially adapted to the economical transportation of cargo, and aircraft suitable for feeder-line operation — through testing, operation, and modification. Mr. Horne was delegated the authority to carry out the purposes of the Act.

The committee is composed of representatives of those segments of aviation concerned with transport type aircraft development, with Harold D. Hoekstra of the Office of Aviation Safety, as its executive secretary. Members of the committee include representatives from the Civil Aeronautics Board, the National Advisory Committee for Aeronautics, the Air Force, the Navy and from aircraft manufacturers, airline pilots, and scheduled and non-scheduled airline operators, both passenger and cargo. Richard K. Waldo of the CAA's Program Planning Staff serves as special assistant to the chairman.

The committee approved specifications for advanced transport aircraft in three main categories; established policies for testing existing turbine-powered aircraft; established policies for testing advanced type prototype transports; surveyed foreign transport aircraft development; and reported that it had no recommendations to make as to additional legislation needed.

European Survey.—Most striking of its accomplishments was the short but thorough survey of European transport plane development carried on under the direction of Hoekstra. The technical subcommittee of the main committee sent a 6-man survey group abroad to evaluate the accomplishments there and establish the relative position of the United States in this competitive field. The group consisted of Hoekstra; Col. Ted E. Enter of the Department of Defense; Kenneth C. Gordon, member for airframes, Boeing Airplane Co.; Otto E. Kirchner, member for operations, American Airlines; Capt.

W. Q. Moss, Jr., member for piloting, Airline Pilots Association; and Ramond E. Small, member for power plants, General Electric Co.

After examining transport plane progress in England, France, Switzerland, Sweden and the Netherlands in a 2-week tour, the group recommended that the U. S. should get underway immediately on the testing of available turbine-powered aircraft to obtain design, operating, airway and airport data applicable to the development of turbine-powered civil transport aircraft; should establish means for the immediate and rapid development, either by industry

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Fee Increase Approved For Pilot Examination

Increased requirements in the flight examination of private pilots have prompted the Civil Aeronautics Administration to allow designated examiners to charge more for their services in giving such flight tests.

Examinations given by the CAA's Aviation Safety Agents, however, will still be given without cost, and by appointment as the Agent travels through his district on a definite itinerary.

Principal addition to the new requirements is that of a cross-country flight. The applicant must plan and execute such a flight under the supervision and examination of a CAA Safety Agent or a designated examiner. The CAA made a survey of the more active pilot examiners throughout the country and found that in many cases more than twice as much time is required now to give the flight tests, and for completing the records necessary.

The maximum charge which the examiner may make for the flight test is \$7.50, and the maximum charge for giving tests for ratings on the certificate is \$5.00.

CAB Regulation Reduces Weight Of C-46 Planes

The Civil Aeronautics Board has adopted, with the concurrence of the Administrator of Civil Aeronautics, an emergency temporary regulation which will reduce the maximum take-off and landing weight of the C-46 aircraft used in passenger service to 45,000 pounds. Until this emergency action the maximum weight was 48,000 pounds. The Administrator of Civil Aeronautics has been requested by the Civil Aeronautics Board to dispatch telegrams to all operators of C-46's in passenger service apprising them of the new weight limitation.

To Increase Safety.—The Board viewed its action as part of a program designed to increase safety in the operations of the C-46 by civilian operated passenger-carrying services. Another part of the over-all program includes the review of applicable Civil Air Regulations with the idea of possible changes to improve safety standards. The Board's emergency action was premised in part upon formal and informal investigations of recent accidents to passenger-carrying C-46's, in which a total of 82 lives were lost.

The Board stated that its emergency action in reducing the maximum weight of the C-46 passenger aircraft will have the result of immediately increasing the safety factor in the operation of this aircraft pending further consideration by the Board of the adequacy of its regulations, which will require additional time to complete.

The Board recognized that a proceeding is under way in which the proper maximum weight for C-46 operations is under examination and concurrently with its action published a Notice of Proposed Rule-Making which specifically poses the issue whether the Transport-Category requirements of the Civil Air Regulations, with certain modifications should be made applicable to C-46 aircraft. The Board stressed the fact that its emergency action taken is an interim measure designed to give additional safety to the operation of the C-46 aircraft in passenger service.

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CAA Regulation on Runway Length Brings Safety, Savings to Airports

During one period of airport development, runway length was determined by local officials, too often on the basis of civic pride alone. The design was occasionally aimed at something better (longer and stronger) than available at some rival community or with the false hope that if long runways were built, the airlines would be anxious to start scheduled service. These attitudes are obviously unsound and fortunately are seldom evident today.

On the other hand, many municipalities had to be urged to construct or lengthen a runway at their airport for the safe operation of some type of transport aircraft certificated to serve their community. After assuring their taxpayers of the need for such expenditures, the city officials were sometimes perplexed when the inaugural flight during the dedication ceremonies used less than one-half of the new runway on landing and was airborne after a run of 2,000 feet on its departure. When the city engineer or the consultant is unable to explain this condition satisfactorily, the local officials can hardly be blamed for skepticism toward the next "urgent" request for improvements to their airport.

T-Category Regulation

What is the explanation? Were the "city fathers" misled in their runway expenditures by an over-enthusiastic airline representative or an over-cautious CAA engineer? The answer is to be found in a CAA Regulation known as the Transport or "T-Category" Regulation designed to insure the maximum safety for air carrier operations.

This regulation provides that for the operation of transport aircraft with a given loading and under standard conditions, three tests for basic runway length must be applied.

Accelerate and Stop Distance.—In this case, the aircraft starts a normal take-off procedure and accelerates to a velocity slightly less than flying speed. Assuming a failure of the critical engine at that point on the runway, there must be sufficient remaining runway length to bring the aircraft to a stop after cutting all power and with normal application of brakes.

Climb-Out.—The second situation is an alternate to the first. At that point on the runway where the critical engine failed, the pilot elects to proceed rather than stop. The aircraft continues to accelerate then to a velocity at which it can fly safely with the critical engine inoperative. From this point, there must be sufficient runway remaining to enable the aircraft, operating under this handicap, to climb out of the airport with a 50 foot clearance over the end of the runway and to clear all objects in its departure path by 50 feet vertically or 300 feet horizontally with not more than a 15 degree bank.

Landing Distance.—The third requirement specifies a runway length sufficient to permit the aircraft to land and stop within 60% of the runway length after clearing the approach end of the runway by 50 feet vertically.

The longest distance computed for these three conditions will be the "basic" runway length required for that aircraft at the given loading and under standard conditions of no-wind, sea level altitude, standard temperature of 59° F., and level ground. Any shorter length will require a compensating restriction in load sufficient to assure conformance with these 3 requirements of the regulations.

Correction Factors.—Now, the lengths computed in this manner have been referred to as "basic". In other words, the length computed for any specific airplane for a given loading would apply to any airport under standard conditions. However, complete standard conditions seldom exist, and correction factors must be applied for altitude, temperature and runway gradient (slope of the runway).

Altitude.—The density of air is reduced with an increase in altitude and thus affects engine and propeller performance as well as wing lift. Therefore, a correction factor must be applied to the basic length to compensate for the elevation of the field above sea level. For design purpose, the length is increased at a rate of 7% for each 1,000 feet of elevation above sea level.

Temperature.—The effect of temperature varies with the type of aircraft and with different models of power plants in the same aircraft but the airport engineer must obviously select a single correction factor for his design. CAA recommends that the length, after correction for altitude, be further increased at a rate of $\frac{1}{2}$ of 1% for each degree which the mean temperature of the hottest month of the year, averaged over a period of years, exceeds the standard temperature (59° F. at sea level).

Gradient.—The effect of the longitudinal gradient of the runway will vary with the direction of the landing or the take-off as well as with the variations in the amount of gradient throughout the runway length. This refinement may be a problem for the airline in computing loads on each flight but the airport designer must use the least favorable condition. Therefore, a standard compensation for gradient has been established as 20% of the basic length, corrected for altitude and temperature, for each percent effective gradient. Effective gradient is the difference between the maximum and minimum elevations of the runway divided by its total length.

The Middletown Airport

In order to visualize more clearly the effect of these corrections on runway length, it may be worthwhile to consider a hypothetical design for a specific location—say Middletown. This community has been certificated for "Feeder" or "Local" type operations and will be served by equipment requiring a basic length of 3,200 feet. The site is at an elevation of 500 feet and the runway gradient is tentatively estimated as 1%.

The correction for altitude would be 112 feet, the correction for gradient 712 feet, and assuming a correction for temperature of 250 feet, a total length amounting to 4,274 feet would be required for a runway of 3,200 feet basic length.

Now, if this length is not provided in full, the air carrier serving Middletown will be forced to operate in and out of the airport during many periods with a load penalty. The restriction on pay load may be so severe as to make the route unprofitable and the service unsatisfactory, thereby providing a basis for cancellation of the operating certificate.

Economic Problem Possible.—The operation into a sub-standard airport on an air carrier's route can be a serious economic problem. An airline operating between Boston and New York with Convairs, for example, can carry a full load of passengers and express as well as extra fuel between these points. However, if the route includes a stop at an intermediate city where the runways are below standard for such equipment, the take-off load at both New York and Boston must be substantially reduced regardless of the size of those terminal airports in order to satisfy the landing weight restrictions at the intermediate stop. Then, on departure, the take-off weight from the intermediate city becomes a handicap, even though the airport of destination is large

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DEPARTMENT OF COMMERCE
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Civil Aeronautics Administration
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CAA and CAB Releases

Copies of CAA releases may be obtained from the CAA Office of Aviation Information. CAB releases are obtainable from the Public Information Section of the Board.

Administration

Duster Pilots to be Considered for Deferment—(CAA 52-5) (Jan. 10).

CAA Statistical Handbook for 1950 Now Available—(CAA 52-6) (Jan. 25).

CAA Will Allow Increased Charges for Pilot Exams—(CAA 52-7) (Jan. 27).

CAA to Sell Summary of Airworthiness Directives—(CAA 52-8) (Feb. 1)

Board

CAB Stays Foreign Air Carrier Permit of Cuban Airline—(CAB 52-1) (Jan. 3).

Wisconsin Central's Certificate Renewed by CAB—(CAB 52-2) (Jan. 5).

CAB Adds Mason City to Mid-Continent's Route—(CAB 52-3) (Jan. 5).

CAB Decides North Central Route Investigation case—(CAB 52-4) (Jan. 5).

CAB Sets Hearing Date for Continental Charters, Inc. Accident at Little Valley, N. Y.—(CAB 52-5) (Jan. 11).

CAB Announces Issuance of 1950 Airline Traffic Survey—(CAB 52-6) (Jan. 15).

CAB Decides Reopened California-Nevada Service Case—(CAB 52-7) (Jan. 17).

CAB Institutes Merger Investigation—(CAB 52-8) (Jan. 17).

CAB Renews Southwest Airways Certificate—(CAB 52-9) (Jan. 29).

CAB Discloses Preliminary Findings of Fact Relating to Uncontrolled Maneuver of a DC-4 Transport Aircraft—(CAB 52-10) (Jan. 30).

enough to accommodate operations at full gross weight. This situation is frequently responsible for the empty seats, rather than a lack of passengers. Needless to say, the passengers who are refused seats at New York and Boston, as well as the intermediate points, would not be too happy about the service, either.

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United Loses Stops; Local Service Carrier To Serve Four Points

The Civil Aeronautics Board late last month, in its decision in the Southwest Renewal-United Suspension Case, authorized the renewal, up to and including September 30, 1954, of the certificate of public convenience and necessity of Southwest Airways Company. Southwest is a local service carrier, based at San Francisco, with a route extending from points in Southern Oregon to Los Angeles and Long Beach, Cal., via numerous California points.

The Board also amended the certificate of United Air Lines, Inc., to provide for the suspension, to September 30, 1954, of United's service to Santa Barbara, Monterey, Red Bluff and Eureka, Cal., points now served by Southwest. United was permitted to continue its service to Salinas, Cal., and Klamath Falls, Oreg., the suspension of which points was under consideration in this proceeding. Southwest's application for extension of its route to Salinas and Klamath Falls was denied.

Outstanding Record.—In renewing Southwest's certificate, the Board said that, " * * * we cannot but take pride in the outstanding performance record of this carrier. The results experienced have fully justified the confidence in the feasibility of local air service on the West Coast with which the original certification was identified. We have previously expressed our satisfaction as to the 'exemplary' manner in which Southwest voluntarily petitioned this Board to reduce its mail compensation in view of its recent relative prosperity. On this record there is no question of the carrier's fitness, willingness and ability to operate route No. 76 until September 30, 1954." The Board further noted that Southwest is still some distance from self-sufficiency, and continues to receive substantial mail payments annually, a large part of which must be regarded as subsidy.

In suspending service by United at four points also served by Southwest, the Board said that it is here invoking its statutory suspension power in an effort to reduce somewhat the overall cost of the air transportation system to the Government.

It was further emphasized that the Board's action in suspending United's service to the four points is temporary in nature and should be considered in its true light as a temporary step in an effort to experiment with techniques of reducing Federal subsidy in transportation.

The Board did not require United to suspend service to Salinas and Klamath Falls, and denied Southwest's application to serve those points because, among other things, it did not seem apparent that the substitution of Southwest for United at these points would hasten Southwest's progress along the road to self-sufficiency or result in mail pay savings to the Government.

The Board did, however, invite the attention of United to the possibility of voluntary suspension at Salinas at least temporarily, since that point will be its only stop between Los Angeles and San Francisco, and such suspension might enable United to make better use of its equipment at other points where traffic demands are greater.

CAB Institutes Merger Investigation

The Civil Aeronautics Board has instituted an investigation to determine whether the merger of Southwest Airways Company and Bonanza Air Lines, Inc., would be in the public interest and in accordance with the public convenience and necessity.

The Board stated that its action in instituting the investigation is in furtherance of its policy of exploring possible mergers of subsidy supported carriers.

Cuban Airline Permit Suspended by Board

In an action approved by the President of the United States, the Civil Aeronautics Board last month issued a stay order which has the effect of suspending indefinitely the temporary foreign air carrier permit issued to Compania Cubana de Aviacion, S.A.

In its order suspending the permit, the Board stated that the Cuban Government "issued but may have suspended" permission to National Airlines for non-stop service between New York and Havana. The Board has stated in its previous opinion granting the New York-Havana route to Cubana that the principles of reciprocity constituted one of the reasons for the granting of the permit to Cubana. As a result of the Cuban Government's suspension of National's permit, reciprocity no longer exists with respect to Cubana's permit. Consequently, the Board has issued an order staying the permit previously issued to Cubana, pending further consideration and further order in this matter by the Board.

A permit for National's service had been issued by the National Transport Commission of Cuba and signed by the President of Cuba on July 4, 1951, upon condition that the permit should not become effective until a "similar authorization" had been granted by the United States to a Cuban Company. On November 13, 1951, the permit to National was made effective through its publication in the Official Gazette of Cuba.

Order Suspends Operations.—According to information received through the Department of State, the National Transport Commission of Cuba, acting pursuant to a resolution of the Cabinet, issued an order on November 30, 1951, notifying National Airlines that it could not inaugurate non-stop New York-Havana service "until the issue raised * * * by Compania Cubana de Aviacion, S.A. has been resolved." It is understood that the issue raised by Cubana concerns alleged lack of similarity between the National permit and the foreign air carrier permit issued by the Board to Cubana.

Subsequent to issuance of the Cubana permit on August 13, 1951, the Board received a petition for reconsideration from Cubana objecting to the conditions imposed in the permit. Among these conditions was the provision that Cubana shall not, in its adver-

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Wisconsin Central's Renewed Certificate Includes New Routes

The Civil Aeronautics Board recently extended the operating authority of Wisconsin Central Airlines, Inc., a local service carrier with headquarters at Madison, Wis., until September 30, 1955, and made a number of adjustments in the route pattern of that company including the establishment of additional local services in Minnesota and North Dakota.

The Board granted Wisconsin Central authority to provide service to Wausau and Eau Claire, Wisconsin, and at the same time it permitted Northwest Airlines, Inc., to continue suspension of its service at these points. The Board also authorized Wisconsin Central to provide direct service between Duluth and the Twin Cities, and suspended Northwest's present route between those cities. In taking this action the Board pointed out that there would be a resulting savings to the Government in the form of mail pay support of an estimated \$130,000 annually. The Board said that this action would more than meet the needs of Duluth for air transportation since the local service carrier could be expected to devote its best efforts to develop the Duluth traffic.

Isolated Cities to be Served.—Recognizing the interest of the State of Minnesota in improving air service to the smaller isolated cities in Minnesota, the Board acted favorably upon certain route proposals suggested by the State and extended Wisconsin Central from the Twin Cities to St. Cloud and beyond St. Cloud to Fargo via Alexandria and Fergus Falls, and beyond St. Cloud to Grand Forks via Brainerd, Bemidji, and Thief River Falls. It also extended the route of Wisconsin Central from Duluth to Hibbing and International Falls, with service to the latter point limited to the summer months from June 1 to September 30.

The Board deferred action on the renewal of that part of Wisconsin Central's certificate which authorizes service in the area between Hancock-Houghton and Green Bay, to be decided simultaneously with the Michigan-Wisconsin Service Case. The Board made it clear, however, that Wisconsin Central's service in the area between Hancock-Houghton and Green Bay has been in operation and will continue

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Blue to be Predominant On Aeronautical Charts

Blue will be the predominant color on the aeronautical charts in the near future, officials of the U. S. Coast and Geodetic Survey said recently in listing chart revisions to be made in coming months.

Some of the major changes are the result of agreements made in the International Civil Aviation Organization while others result from actions taken by the Air Coordinating Committee. Minor changes to increase the usefulness of the charts will also be effected, they said.

Standard Navigational Series.—The changes in the aeronautical information overprint on the Sectional Charts, World Air Charts, etc., from magenta (the red tint) to blue will start during this month. However, during the transition period when CAA is changing from low frequency aids to high frequency, magenta will be used for the low frequency airways and their associated radio facilities. Blue will be used for all other aeronautical information such as control zones, danger areas, homing facilities, etc. Eventually the whole aeronautical overprint will appear in blue.

Airport symbols will be modified so that there will be three different symbols—one for civil fields, one for military fields, and one for joint fields.

Approach and Landing.—The color of the aeronautical overprint was recently changed to blue. A program now in progress will eliminate excess base or ground information to the extent that only topographical information which can be evaluated by pilots in flight will be shown.

Change-Over to Nautical Miles.—Little change is expected at present in the standard navigational series except for the addition of a nautical mile scale where one is not now shown, and an explanation of the difference between statute and nautical miles on the back of the chart. In the near future a Civil Airways and Mileage Chart showing distances in nautical miles will be issued as part of the RF series. For some time thereafter a prominent note will appear on the charts to the effect that the distances are in nautical miles.

The changes in most cases will be done gradually. The standard navigational series will be revised in the following order: Sectional, Local, WAC, Flight, and then all others. The AL charts and the RF series will be changed as new editions become necessary. A new edition of RF-VOR charts will be issued at the time CAA implements the high frequency airways system.

Official Actions Civil Aeronautics Board

Regulations

Amdt. 25-2.....Effective January 3, 1952

Amends Part 25 with respect to the exchange of expired Parachute Technician Certificates.

In adopting this amendment the Board issued an explanatory statement, a portion of which follows:

"The Civil Aeronautics Administration has drawn the attention of the Board to the fact that a number of persons have neglected to exchange their certificates for the new type due to lack of actual knowledge of this provision. The CAA has proposed that the Administrator be empowered to reissue new certificates to the holders of expired old-type certificates without other showing on the part of the certificate holder. The Board considers that this should be done and that no good reason exists for refusing to allow the continued exchange of old-type certificates as requested by the CAA. . . ."

Amdt. 26-5.....Effective January 15, 1952

Amends Part 26 with respect to identification cards for military control tower operators.

The Board issued the following statement in connection with the adoption of this amendment:

"It has been brought to the attention of the Board that there are several airports used jointly by civil and military aircraft. In compliance with the requirements of the Civil Aeronautics Act of 1938, as amended, the military control tower operators at such fields must be certificated by the CAA in order to control the civilian air traffic. Although such control tower operators are now required to possess identification in the form of the Board considers that sufficient identification is obtained by the use of regularly issued armed forces identification cards.

"This amendment, therefore, provides that military control tower operators who control civil and military aircraft jointly shall be deemed to have met the airman identification card requirements if they have in their possession currently valid armed forces identification cards."

SR-379.....Effective Date Pending

Application of certain transport category performance requirements to the C-46 type aircraft. In connection with this regulation the Board issued the following statement:

"1. On July 6, 1951, the Board issued a notice of Proposed Rule Making under which the standards applicable to the C-46 with respect to the maximum certificated weight for passenger operations would be modified.

"2. Thereafter in the light of certain protests and requests for hearing as to the factual basis for the proposed rule, the Board instituted a proceeding on the matter of the modification of the requirements with respect to the weight of the C-46 in the interest of safety, and set it down for hearing before an Examiner; this proceeding is still pending before the Board, the Examiner's Report, containing his findings of fact but no recommended conclusions, having just been issued.

"3. In the last 50 days there have been three accidents in common carrier operation involving C-46 aircraft; two of these accidents resulted in the loss of 82 lives.

"4. The occurrence of these accidents has resulted in the Board's institution of formal investigations to determine the causes of such accidents and informal investigations concerning the safety of operations and maintenance practices and procedures of the specific carriers concerned in the accidents.

"5. Preliminary data obtained from the formal and informal investigations and from other sources of information available to the Board, have indicated an apparent laxness in operating practices and procedures followed by the carriers investigated in some or in all of the following aspects: (a) Failure to maintain pilot training and proficiency at a desirably high level; (b) Failure to ensure aircraft and engine maintenance at a desirably high level; and (c) Failure on the part of the companies and their personnel to follow certain operating procedures established in accordance with the Civil Air Regulations, including those pertaining to maximum operating weights.

"6. The accident record of the C-46 aircraft in irregular carrier operation since 1947 shows 39 accidents. Seven involved the loss of power of one engine, 24 the factor of pilot error, and 9 the failure on the part of other personnel including maintenance personnel.

"Five of the seven accidents involving loss of one engine occurred on take-off, and all five of such accidents at least partially resulted from inadequate maintenance. In the sixth case, one engine failed in cruising flight, and soon thereafter the other failed necessitating a forced landing in the ocean. In the seventh case, fire in one engine occurred during normal flight necessitating an emergency landing.

"According to best estimates, the irregular carriers operated 32,598,000 C-46 plane miles during 1950-51 with the rate of 6.4 accidents per 10 million plane miles. The Board regards this rate as being unnecessarily high and not in line with the accident rates on other aircraft.

"7. The Civil Air Regulations currently provide two general standards for airworthiness—the Normal category (Part 3) and the Transport category (Parts 4a, 4b). The DC-3 and the Lockheed 18 were both introduced into service prior to the time the transport category requirements were adopted, and consequently are not certificated under these standards. However both these airplanes will at sea level meet and even exceed the performance requirements of Part 4b. The C-46 was certificated under Part 3 of the Civil Air Regulations and cannot comply with the take-off performance requirements of the transport category at the maximum certificated weight at which it is now operated (see Examiner's Report, Docket No. 5107, p. 11, f.n. 9). Thus, the C-46 is the only large multi-engine aircraft in general passenger use which at sea level will not comply with the take-off performance requirements of Part 4b, at the maximum certificated weight at which it is operated, i.e., 48,000 pounds.

"8. The provision in Part 4b of the Civil Air Regulations for transport category aircraft which performance-wise would, if applied, constitute the effective limit of the maximum certificated take-off weight of the C-46 is that which requires the single-engine rate of climb, in the take-off configuration with the landing gear retracted and the inoperative propeller windmilling, to be not less than $0.035 V_{s0}$, where V_{s0} is the

established stalling speed in the pertinent configuration. In determining the maximum take-off weights under the Transport category, it is assumed that (1) the foregoing configuration will be encountered shortly after a take-off during which one engine fails at the most critical point during the ground run and the pilot continues the take-off, and (2) that the pilot will not start to feather the propeller until a height of 50 feet is reached.

"On the basis of the foregoing and recognizing that safety in the air is accomplished not by any single means, but by constant attention to the improvement of maintenance and of operating practices and procedures, by constant attention to the development of greater pilot skill and proficiency and by development of appropriate standards for the performance of aircraft, and further recognizing that many accidents are caused, not by a single factor but by a combination of circumstances which may embrace any or all of the foregoing factors, the Board is of the opinion and finds that in the case of the C-46 aircraft, an emergency exists which requires that immediate action should be taken to apply to this aircraft standards of performance more nearly comparable to those met by other aircraft used in passenger service which will necessarily result in lowering the maximum weight of this aircraft, thus providing a further margin of safety. In so doing the Board recognizes that the present accident record of the C-46 aircraft does not demonstrate conclusively that any single accident is entirely the result of the weight factor, but has in mind the truth that the lighter the total weight of the aircraft, the higher its operating performance can be expected to be and the easier it will be to fly safely. The Board in making its present determination is acting only upon the present state of facts and without prejudice to a determination as to what the ultimate standards for determining the maximum weight of the aircraft should be.

"The Board's action is designed to increase the safety factor for the interim period which will be necessary before the Board can finally decide all of the various questions involved in this problem and before such program as may be found necessary can be fully implemented. It is anticipated that the Board in conjunction with the Administrator of Civil Aeronautics will proceed with its efforts to arrive at a conclusion as to the proper safety rules under which the C-46 aircraft is to be operated in passenger service on a continuing basis and that the maintenance and operating practices and procedures of the operators of the C-46 aircraft will be more strictly supervised and examined.

"The Board, in a Notice of Proposed Rule Making to be published concurrently with the issuance of this regulation, proposes to examine the question whether it is necessary in the interest of safety to apply, on a permanent basis, the Part 4b performance requirements, with the exception of those applicable to the second segment of the take-off climb, to C-46 aircraft operated for the carriage of passengers for remuneration or hire. In the interim, and pending the accomplishment of the foregoing, which cannot be completed soon enough to obviate the necessity for this emergency regulation, it is the Board's intention to require immediately that any C-46 operated in passenger-carrying service be limited to a maximum weight of 45,000 pounds. This weight was determined substantially in accordance with the take-off performance requirements of the transport category, but with the aircraft permitted to meet the second segment rate of climb requirement as though it were in the third segment configuration, i.e., the propeller feathered, and with no further weight reduction for airport elevations.

"The precise maximum weight at which the C-46 aircraft will meet the standards which the Board desires to impose cannot be definitely ascertained at this time since untested data are not available. In his report, the Examiner mentions the weight of 45,400, 44,300, and 43,600 lbs., as possible weights at which the standards mentioned above would be met, depending upon what data are relied on. As an interim measure the Board has decided to use a value of 45,000 lbs. While it is realized that this value is not an exact one in an engineering sense, the Board believes it to be a fair one. As this is a value to be used only during the interim period, the Board does not intend to propose different values to accord for the differences between the C-46 E and F models, or between the aircraft equipped with the Hamilton Standard and Curtiss propellers. The limitations imposed herein are in addition to those already in effect, and this action in no way authorizes operation of C-46 aircraft in excess of maximum weights already established pursuant to other existing requirements.

"Temporarily, at least, the Board intends to permit the irregular operators to continue to operate their C-46 aircraft under the nontransport category operating limitations of Part 42 of the Civil Air Regulations, namely §§ 42.80-42.83. It is believed that the application of these operating rules to the C-46 has resulted in increased safety and that they are adequate for the present. The Board is currently considering this entire matter further and may propose modifications to these operating rules which would be applicable to the C-46 and other nontransport category aircraft at a later date. The Board intends to apply this modified transport category requirement to all aircraft being operated in passenger service and it is proposed, therefore, that all C-46 aircraft used in cargo service, at least for the present, continue to be operated at the weights determined in accordance with the existing standards applicable to such aircraft.

"In reaching the determination on an emergency temporary basis to apply standards which will lower the maximum weight of the C-46 aircraft in passenger service, the Board is not unmindful that there will be certain economic effects on the carriers who operate this aircraft in passenger service. However, the weight at which the Board has determined the aircraft should be flown pending final disposition of the matter is approximately the weight at which some of the C-46 aircraft already being operated in passenger service by a number of irregular carriers and the Board's action herein will not prevent the continued operation of the aircraft carrying substantial traffic loads. Furthermore, the operation of the C-46 over shorter distances will make it possible to minimize the loss of passenger-carrying capacity which is now figured on the basis of fairly long-range operations. In any event, the Board finds that such economic losses as may accrue to the operators of the C-46 in passenger service as a result of the Board's

action are more than outweighed by the additional safety sought to be accomplished.

"In view of the foregoing, the Board is of the opinion that an emergency requiring immediate action exists in respect of safety in air commerce, that notice and public procedure hereon are impracticable, and that the following Special Civil Air Regulation is required in the interest of safety.

"In order that an appropriate basis for final rule-making action with respect to the performance standards to be met by the C-46 aircraft operated for the transportation of passengers by irregular carriers may be fully explored, the Board is issuing concurrently herewith a Notice of Proposed Rule-Making proposing performance standards consistent with the interim action taken herein, as a possible alternative to the proposal issued on July 6, 1951; which based the ultimate take-off weight upon a zero rate of climb in the take-off configuration. The Board will receive written comments and will hear oral argument on such notice, at the same time as oral argument is heard in the C-46 investigation referred to in paragraph 2 of this Special Regulation.

"Accordingly, the Civil Aeronautics Board hereby makes and promulgates a Special Civil Air Regulation effective immediately until further order of the Board, to read as follows:

"After 12:01 A.M. Eastern Standard time February 3, 1952 all C-46 type aircraft used for the carriage of passengers for remuneration or hire shall be limited not to exceed a maximum take-off and landing weight of 45,000 lbs."

Safety Orders

S-470 dismisses the appeal of the Administrator of Civil Aeronautics from the examiner's initial decision and order in the matter of a complaint against Edna T. O'Leary. (Jan. 4.)

S-471 denies appeal of Donald Niblock, Jr., from the examiner's initial decision in the matter of a complaint of the Administrator of Civil Aeronautics; revokes, effective Jan. 20, 1952, any airman mechanic certificate held by him, and orders that no airman mechanic certificate of any type shall be issued to him prior to Jan. 20, 1953. (Jan. 10.)

Airline Orders

E-5918 denies petition of Golden North Airways to reopen the proceedings and vacate order No. E-4727; to consolidate with Docket No. 5132; to reinstate Golden North's operating authority pending determination of the Large Irregular Carrier Investigation, and to amend order No. E-5722 so as to include its application in Docket No. 3878 for an exemption. (Dec. 6.)

E-5919 grants the State of Texas leave to intervene in the matter of the application of Central Airlines for renewal of its temporary certificate for air transportation of persons, property, and mail over route No. 81. (Dec. 5.)

E-5920 dismisses proceeding of investigation and suspension instituted in the matter of fares and rates proposed by Northern Consolidated Airlines for casual, occasional or infrequent service. (Dec. 6.)

E-5921 denies application of Pioneer Air Lines for a change in service pattern with respect to points in Texas, and for a temporary exemption from the provisions of section 401 of the Act so as to serve Brownwood, Texas, pending decision of the Board in Docket No. 5056. (Dec. 6.)

E-5922 denies application of Pioneer Air Lines for a temporary exemption from the provisions of section 401(a) of the Act so as to serve Monahans, Texas, as a point on segment 3 of its route No. 64. (Dec. 6.)

E-5923 dismisses, for want of prosecution, the application of Lawrence M. Coleman, d/b/a/ Samoan Airlines, for a certificate (Docket No. 5080). (Dec. 7.)

E-5924 grants Western Air Lines and Inland Air Lines exemption from the provisions of sections 401(i) and 408 of the Act so as to permit the dissolution of Inland and the acquisition of its assets by Western, including certificates for routes Nos. 28 and 35, subject to the Board's approval of detailed plans. (Dec. 7.)

E-5925 opinion and order in the Kani Peninsula Service case amend certificate of Pacific Northern Airlines so as to eliminate its route between Anchorage and Seward, Alaska; issue certificate for 3 years to Hakon Christensen, d/b/a/ Christensen Air Service, authorizing air transportation of persons, property, and mail between Seward and Anchorage, through Dec. 31, 1954; grant Gentry W. Shuster, d/b/a/ Safeway Airways, exemption for 3 years, subject to conditions, authorizing air transportation of persons and property between Seward and Anchorage, Seward and Whittier, and Seward and Homer, within Alaska; institute proceedings (Dockets Nos. 5217 and 5218) to determine whether certificate of Alaska Airlines should be amended so as to eliminate segments 9 and 10 between stated points in Alaska; otherwise deny. Approved by the President Dec. 3, 1951. (Sept. 20.)

E-5928 denies motion of Pan American World Airways to withhold from public disclosure copies of certain exhibits and testimony in the matter of the North Atlantic Certificate Renewal case. (Dec. 7.)

E-5929 grants the County of Broome, N. Y., and the Poughkeepsie Chamber of Commerce leave to intervene in the matter of the application of Robinson Airlines Corp. for renewal of its certificate for route No. 94. (Dec. 10.)

E-5930 approves, subject to stated conditions, interlocking relationships existing by reason of the holding by Clarence M. Bellin of certain positions in American Helicopter Company and Los Angeles Airways, Inc. (Dec. 10.)

E-5931 grants Lake Central Airlines exemption, subject to stated provisions, from certain provisions of section 207.5 of the Board's Economic Regulations so as to permit it to make charter trips and perform other special services; such exemption to be effective on the date of this order and continue until 60 days after the Board's decision in the *Indiana-Ohio Local Service* case, Docket No. 4634, et al, becomes effective; otherwise denies. (Dec. 10.)

E-5932 rescinds Board order No. E-5748 insofar as it denied the petition of Northwest Airlines for leave to intervene, and grants Northwest Airlines, the Oakland Chamber of Commerce, the City of Oakland, the City of Kansas City, and the City

(Continued on Page 17)

CAB Reduces Weight of C-46 Aircraft

(Continued from Page 13)

ice until such time as the proper maximum take-off and landing weights can be definitely established. It proposed that the existing investigation together with the proposed rule go forward simultaneously to oral argument as soon as is feasible so that the effective period of the Board's emergency regulation will not be unduly prolonged.

In taking its action the Board pointed out that it is aware that the reduction in the maximum take-off and landing weights will produce certain adverse economic effects on the carriers who operate the C-46 aircraft in passenger service but pointed out that some C-46 aircraft are presently being operated with a maximum weight of 45,000 pounds and that 45,000 pounds is the weight at which the original certification of the C-46 was made by the Civil Aeronautics Administration. It was further noted that, by reducing the length of hops, it will be possible for the operators of C-46 aircraft to minimize the loss of passenger carrying capacity as a result of the weight limitation.

Dissenting Opinion.—"We dissent," members Lee and Adams said, "because the regulation would not have prevented any of the accidents relied upon by the majority as justification for this emergency action. Overweight was not the probable cause in any of the accidents referred to. The Board has conducted lengthy hearings on the gross weight of the C-46. The examiner's report has been released and in the very near future the Board will have the opportunity to pass upon this question after all parties have been heard and all facts carefully examined."

CAM Supplements and Aviation Safety Releases

(Issued between January 1, 1952 and January 31, 1952, and obtainable from the CAA Office of Aviation Information, Department of Commerce, Washington 25, D. C.)

CAM Supplements

CAM No.	Supplement No.	Date	Title
61	11	1/10/52	Airman Utilization and Instrument Competency.

Aviation Safety Releases

No.	Date	Subject
353	1/4/52	ANC-5 "Strength of Metal Aircraft Elements," Revised June 1951 (Supersedes ASR 324 and ANC-5a).
354	1/14/52	Magnetic Direction Indicators (Non-stabilized type).
355	1/15/52	Use of Highly Leaded Gasoline.

Runway Length Regulation

(Continued from Page 14)

Getting back to the runway requirements and, particularly, the corrections, it is obvious that the engineer has very little opportunity in his design to eliminate or reduce the effects of altitude and temperature. These are topographic and climatic characteristics of the community. However, the engineer may be in an excellent position to neutralize to some extent the effect of gradient on the runway length by an adjustment in the profile.

Eliminating or minimizing the gradient may require the engineer to abandon some highway construction principles, but by flattening the profile,

Additional Service for Bonanza, Decision in Local Service Case

The Civil Aeronautics Board, in its decision in the Reopened Additional California-Nevada Case, authorized additional service for Bonanza Air Lines, Inc., a local service carrier based at Las Vegas, Nevada, by providing for service between Phoenix, Arizona, now served by Bonanza, and the co-terminal points Los Angeles and Long Beach, California, via the intermediate points Santa Ana-Laguna Beach, Oceanside, San Diego, and El Centro, California, Yuma, and Ajo, Arizona, and Blythe, California. The Board further provided that Western Air Lines be temporarily suspended at El Centro and Yuma, and further authorized suspension of authority of Frontier Airlines for service between Yuma and Phoenix, via Ajo, Arizona. Frontier, as directed by the Board, held up inauguration of service over the suspended Yuma-Phoenix segment, pending decision in this proceeding.

Bonanza's present route extends from Reno, Nevada, to Phoenix, Arizona, via several intermediate points.

In selecting Bonanza over Southwest to provide the additional local service in the Los Angeles-Phoenix area, the Board said that Bonanza is one of the smallest local service carriers and is now severely hampered by a lack of sufficient traffic and revenue volume over which to spread its overhead costs, and it cannot obtain maximum utilization of its aircraft. The Board said that the award of additional route miles to its system with the traffic and revenue potential available thereon would tend to lower its system unit operating costs and thus, to improve its economic position.

It is further believed, the Board said, that the cities to be served on Bonanza's expanded route will profit from the service provided to Phoenix, Los Angeles and San Diego, and from the possibility of more convenient scheduling of flights to permit round-trips to metropolitan areas in the same day.

CAA Technician Gets Award

A Civil Aeronautics Administration radar technician, whose ingenuity is saving the government thousands of dollars annually, was presented an award of \$375 for outstanding efficiency by Secretary of Commerce Charles Sawyer last month.

The award was made to Rex R. Brown, maintenance technician in charge of the radar installation at Los Angeles International Airport, who devised special tools, suggested improved overhaul procedures, and developed equipment modifications which will result in savings of approximately \$80,000 over a period of 5 years.

Mr. Brown, a native of San Pedro, California, where he was born 39 years ago, came to work for the CAA in 1939 as a communicator at Tintic, Utah. After 2 years there, he transferred to maintenance work and was in charge of a sector in southern California and southern Arizona, with headquarters at El Centro, California. Three years ago he went into radar work and for the past two and a half years has been stationed in Los Angeles.

the cost of the expensive items such as paving, drainage, and lighting involved in the extra length required by the correction can be eliminated.

In the hypothetical case of the Middletown Airport, the extra length to compensate for the 1% grade was over 700 feet. On an average airport in the New England States, this 700 foot section would cost approximately \$50,000. Converted to grading, this sum might permit a substantial adjustment in the runway profile as well as a saving in cost.

Cuban Airline Permit Suspended by Board

(Continued from Page 15)

tising (including the insignia on its aircraft) or its public relations, publicity, scheduling, or otherwise disclose any relationship (other than the general agency relationship) existing between it and Pan American World Airways. The Board also required that neither Cubana nor Pan American shall act as agent for nor employ the other for the sale of tickets, the acceptance and delivery of air cargo shipments, the solicitation of traffic or the furnishing of ticket office and reservation facilities. It was not the Board's intention, however, by this condition, to prevent either Cubana or Pan American from issuing interline tickets or waybills for transportation involving carriage on the aircraft of both parties.

The Board said in its original opinion that the conditions it was imposing with respect to the Pan American-Cubana relationship, and with respect to ticketing and sales agency activity are necessary because of the particular competitive conditions existing in this situation. In passing on any applications in the future in which similar competitive conditions were involved, the Board stated that it was its intention to impose similar restrictions. The permit was limited to a 3-year period, in accordance with the Board's usual practice in cases where a permit is granted for a new route without the existence of a bilateral agreement.

Federal Airways Facilities

The following is a tabulation of the facilities maintained and operated by CAA's Office of Federal Airways as of December 31, 1951.

Civil Airways	
Controlled Civil Airways, Mileage	74,424
Non-controlled Civil Airways, Mileage	3,372
Oceanic Routes, Mileage	15,412
Landing Areas	
Intermediate Fields	89
Jointly Operated Fields	47
Lighting Aids	
Airways Beacons (excluding those at landing areas)	917
Neon Approach Light Lanes	77
High Intensity Approach Light Lanes	28
Navigation and Landing Aids	
Airport Surveillance Radar	10
Fan Markers	283
Distance Measuring Equipment	14
High Power Non-directional Radio Beacons	9
Instrument Landing Systems	37
Low/Medium Frequency Ranges	375
Low/Medium Power Non-directional Radio Beacons	149
Precision Approach Radar	10
VHF Omronars	351
VHF Visual Aural Ranges	34
Communications Facilities	
INSACS	427
OFACS	15
Traffic Control Facilities	
Air Route Traffic Control Centers	31
Mechanical Interlocks	18
Airport Traffic Control Towers	157
Combined Tower/Stations	19
Teletype and Interphone Service	
Weather Reporting Circuits	
Teletype Mileage, A, C & O	79,510
Teletype Drops, A, C & O	913
Traffic Control Circuits	
Teletype Mileage—B	34,321
Teletype Drops—B	518
Interphone Mileage—F	64,450
Interphone Drops—F	3,294

¹ Operating on test.

Official Actions CAB

(Continued from page 16)

and County of San Francisco leave to intervene in the matter of the application of Western Air Lines for amendment of its certificate so as to extend its route from Salt Lake City, Utah, to Rapid City, S. Dak., via Casper, Wyo.; otherwise denies. (Dec. 10.)

E-5933 amends permit of "El-Al" Israel Airlines Limited so as to include points in the Netherlands, Belgium, Luxembourg, and Turkey as additional intermediate points on its route between Israel and United States. Approved by the President Dec. 8. (Dec. 16.)

(Continued on Page 18)

Regulations of The Administrator

Through February 1, 1952

Note: Regulations of the Administrator marked with an asterisk (*) on the list given below may be obtained from the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C., at the prices indicated. Remit check or money order, made payable to the Superintendent of Documents, directly to the Government Printing Office. Copies of amendments may be obtained free of charge from the Office of Aviation Information, CAA, Washington 25, D. C., or may be found in the Federal Register for the dates indicated in parentheses. Copies of the Federal Register are obtainable from the Superintendent of Documents.

Organization

*Part 400—Organization and Functions. (10c.)
Amendments: 1 (July 11, 1951), 2 (August 10, 1951), 3 (Jan. 8, 1952), 4 (Jan. 17, 1952).

Procedures

*Part 405—General Procedures. (5c.)
*Part 406—Certification Procedures. (10c.)
*Part 407—Recordation Procedures. (5c.)
*Part 408—Enforcement Procedures. (5c.)
Amendments: 1 (Available from CAA.), 2 (October 23, 1951).
*Part 410—Delegation Option Procedures for Certification of Small Airplanes. (5c.)

Rules

Airmen

*Part 450—Inter-American Aviation Training Grants. (5c.)

Aircraft

*Part 501—Aircraft Registration Certificates. (5c.)
*Part 502—Dealers' Aircraft Registration Certificates. (5c.)
*Part 503—Recordation of Aircraft Ownership. (5c.)
*Part 504—Recordation of Encumbrances Against Specifically Identified Aircraft Engines. (5c.)
*Part 505—Recordation of Encumbrances Against Aircraft Engines, Propellers, Appliances, or Spare Parts. (5c.)
Part 506—Aircraftworthiness Directives Recordation. (Available without charge from CAA.)
Part 514—Technical Standard Orders — C Series — Aircraft Components. (October 12, 1951.)

Airports

*Part 550—Federal Aid to Public Agencies for Development of Public Airports. (10c.)
Amendments: 1-15 (Available from CAA.)
*Part 555—Acquisition of Government-owned Lands for Public Airport Purposes. (5c.)
*Part 560—Reimbursement for Damage to Public Airports by Federal Agencies. (10c.)
Amendments: 1-2 (Available from CAA.)
*Part 570—Rules of Washington National Airport. (5c.)
Amendments: 1-2 (Available from CAA.)
*Part 575—Federal Civil Airports on Canton and Wake Islands. (5c.)
*Part 580—Anchorage Airport and Fairbanks Airport. (December 12, 1951.)

Air Navigation

*Part 600—Designation of Civil Airways (including amendments 1 through 18). (10c.)
Amendments: 19-61 (Available from CAA.)
*Part 601—Designations of Control Areas, Control Zones and Reporting Points (including amendments 1 through 22). (15c.)
Amendments: 23-66 (Available from CAA.)
Part 600—Danger Areas (October 31, 1951).
Amendments: 1 (Oct. 31, 1951), Correction (Nov. 8, 1951), 2 (Nov. 15, 1951), 3 (Nov. 16, 1951), 4 (Nov. 28, 1951), 5 (Nov. 29, 1951), 6 (Dec. 6, 1951), 7 (Dec. 12, 1951), 8 (Jan. 8, 1952), 9 (Jan. 8, 1952), 10 (Jan. 24, 1952), 11 (Jan. 23, 1952), 12 (Jan. 31, 1952).
Part 609—Standard Instrument Approach Procedures. (July 27, 1951). Amendments: 1 (August 25, 1951), Correction (October 17, 1951), 2 (Nov. 6, 1951), 3 (Nov. 3, 1951), 4 (Nov. 21, 1951), Correction (Nov. 22, 1951), 5 (Dec. 11, 1951), 6 (Dec. 20, 1951), 7 (Dec. 18, 1951), 8 (Dec. 22, 1951), 9 (Jan. 17, 1952), 10 (Jan. 22, 1952), 11 (Jan. 22, 1952).
Part 610—Minimum En Route Instrument Altitudes. (July 27, 1951, corrected September 21, 1951). Amendments: 1 (August 4, 1951), 2 (August 24, 1951), 3 (Nov. 2, 1951).
*Part 612—Aeronautical Fixed Communications. (5c.)
*Part 617—Airport Traffic Control Rules. (April 21, 1951).
*Part 620—Security Control of Air Traffic. (5c.)
Amendments: 1-5 (Available from CAA.).
*Part 625—Notice of Construction or Alteration. (5c.)

Miscellaneous

Part 635—Reproduction and Dissemination of Current Examination Materials. (Available without charge from CAA.)

Official Actions CAB

(Continued from page 17)

E-5934 orders Continental Air Lines to show cause why the Board should not establish the mail rates set forth in an attached statement as final rates to be paid Continental. (Dec. 11.)

E-5935 dismisses complaint of Braniff Airways in the matter of the revocation of the certificate of Airnews, Inc., for route No. 103. (Dec. 11.)

E-5936 grants United Air Lines leave to intervene in the

Scheduled Air Carrier Operations

[Source CAB Form 41]

Domestic: November 1951

Operator	Revenue miles	Revenue passengers	Revenue passenger miles (000)	Passenger seat (000)	Revenue passenger load factor (percent)	Ton-miles flown		
						Express	Freight	United States mail
Trunk Lines								
American Airlines.....	6,500,846	382,927	197,685	288,488	68.52	713,691	3,127,081	1,525,650
Braniff Airways.....	968,649	61,759	21,535	34,641	62.17	74,931	153,612	130,005
Capital Airlines.....	1,993,724	149,764	45,374	79,160	57.32	181,640	452,821	165,112
Chicago & Southern Air Lines.....	758,306	40,456	15,117	24,912	60.68	59,005	77,873	60,271
Colonial Airlines.....	314,117	19,618	4,830	10,111	47.77	8,210	9,197	9,040
Continental Air Lines.....	618,282	25,740	10,032	20,042	50.05	14,680	53,282	51,637
Delta Air Lines.....	1,302,563	74,586	31,949	46,713	68.39	100,957	287,711	158,881
Eastern Air Lines.....	4,298,932	268,069	111,733	171,874	65.01	320,167	503,685	447,084
Inland Air Lines.....	248,131	9,006	3,613	5,920	61.03	8,029	13,977	18,551
Mid-Continent Airlines.....	694,958	33,678	10,199	18,219	55.98	20,626	41,173	39,925
National Airlines.....	1,238,259	50,867	31,510	50,587	62.29	46,611	431,810	102,734
Northeast Airlines.....	353,558	34,498	6,612	10,653	62.07	14,870	14,100	14,412
Northwest Airlines.....	1,030,888	60,067	38,322	59,094	64.85	131,349	238,791	209,809
Trans World Airlines.....	4,226,996	172,514	120,636	170,674	70.68	553,915	1,247,990	1,112,859
United Air Lines.....	4,979,877	231,550	145,536	207,128	70.26	720,713	1,791,790	1,837,422
Western Air Lines.....	761,968	48,408	17,345	27,800	62.39	36,585	40,775	109,354
Trunk Total.....	30,289,784	1,663,507	812,028	1,226,016	66.23	3,005,979	8,485,668	5,992,746
Feeder Lines								
All American Airways.....	257,987	15,274	2,189	5,418	40.40	10,350	0	5,632
Bonanza Air Lines.....	75,294	2,538	654	1,581	41.37	236	939	508
Central Airlines.....	112,388	4,033	461	2,697	17.09	672	1,426	1,783
Empire Air Lines.....	106,772	3,590	726	2,116	34.31	1,442	0	2,300
Frontier Airlines.....	370,676	8,281	2,124	7,784	27.29	5,761	24,852	9,628
Helicopter Air Service.....	24,617	0	0	0	0	0	0	2,014
Lake Central Airlines.....	92,753	2,667	457	1,882	24.28	4,605	0	1,540
Los Angeles Airways.....	17,766	0	0	0	—	0	0	3,194
Mid-Continent Airlines.....	75,301	3,083	642	1,621	39.61	2,856	3,877	1,444
Mid-West Airlines.....	66,120	252	40	264	15.15	0	0	830
Ozark Air Lines.....	194,181	4,890	782	4,078	19.18	3,937	0	2,552
Piedmont Aviation.....	345,447	15,783	3,570	7,254	49.21	5,721	8,927	6,145
Pioneer Air Lines.....	337,289	14,022	3,592	8,095	44.37	3,634	14,032	9,548
Robinson Airlines.....	139,438	9,842	1,517	2,923	51.90	4,962	2,814	3,038
Southern Airways.....	263,431	9,052	1,668	5,532	30.15	6,034	0	7,009
Southwest Airways.....	193,224	9,368	1,773	4,058	43.69	3,660	7,231	5,596
Trans-Texas Airways.....	244,759	6,708	1,485	5,140	28.89	2,331	6,234	4,334
West Coast Airlines.....	108,032	5,359	798	2,269	35.17	747	1,456	910
Wiggins, E. W. Airways.....	35,632	311	32	140	22.86	79	0	85
Wisconsin-Central Airlines.....	163,466	8,244	1,232	3,433	35.89	7,334	0	5,854
Feeder Total.....	3,217,973	123,297	23,742	66,285	35.82	64,361	71,788	73,944
Territorial Lines								
Caribbean-Atlantic Airlines.....	50,095	7,463	591	1,421	41.59	0	2,635	957
Hawaiian Airlines.....	263,158	25,229	3,236	5,656	57.21	7,529	63,555	2,263
Trans-Pacific Airlines.....	118,071	9,898	1,240	3,306	37.51	186	2,076	1,390
Territorial Total.....	431,324	42,590	5,067	10,383	48.80	7,715	68,266	4,610
Grand Total.....	33,939,081	1,829,394	840,837	1,302,684	64.55	3,078,055	8,625,722	6,071,300

International and Overseas: November 1951

Operator	Revenue miles	Revenue passenger-miles	Revenue passenger-miles (000)	Passenger seat miles (000)	Revenue passenger load factor (percent)	Ton-miles flown			
						Express	Freight	United States mail	Parcel post
American Airlines	233,523	9,119	6,526	11,840	55.12	800	166,578	14,400	0
Braniff Airways	358,559	3,088	6,304	15,377	41.00	0	95,192	22,047	0
Chicago & Southern Air Lines	138,272	1,623	2,009	6,395	31.42	0	72,272	4,396	180
Colonial Airlines	62,014	2,403	1,880	3,225	58.29	0	8,949	1,474	193
Eastern Air Lines	252,736	5,430	7,741	14,981	51.67	0	53,625	42,819	0
National Airlines	65,122	7,058	1,582	3,546	44.61	3,180	33,091	1,300	0
Northwest Airlines	538,641	5,897	9,753	17,372	56.14	22,624	792,147	151,821	0
Pan American World Airways:									
Atlantic Division	1,202,573	24,495	37,113	61,824	60.03	0	1,101,498	373,318	112,278
Latin American Division	2,291,539	53,754	51,249	92,247	55.56	0	2,592,369	264,974	0
Alaska Operations	244,294	3,788	4,410	11,195	39.39	0	493,232	39,976	0
Pacific Operations	781,575	6,579	23,986	36,858	65.08	0	816,600	310,128	13,104
Pan American-Grace Airways	491,616	9,333	10,798	18,029	59.32	211,796	0	32,462	10,659
Trans World Airways	1,046,775	10,270	25,446	42,736	59.54	0	736,001	310,263	48,301
United Air Lines	240,882	3,284	8,134	12,742	63.84	0	60,369	75,846	0
Uruba, Medellin & Central Airways	8,528	241	79	171	46.20	0	4,944	0	0
Total	7,956,649	146,362	197,010	348,529	56.53	238,400	7,027,857	1,645,224	184,725

matter of the North Atlantic Certificate Renewal case. (Dec. 11.)
E-5937 approves certain agreements between Trans World Airlines and Capital Airlines, various other air carriers, and other carriers, relating to intercompany arrangements. (Dec. 11.)

E-5938 approves certain agreements between the Air Carrier Members of the Air Traffic Conference of America, and certain other air carriers, relating to resolutions of the Air Traffic Conference of America covering inter-line and cargo traffic, reservations, and tickets. (Dec. 12.)

E-5939 orders Central Airlines to show cause why the Board should not establish certain temporary rates for the transporta-

tion of mail on and after September 15, 1949, over its entire system. (Dec. 12.)

E-5940 in the Frontier Renewal case, exempts Frontier Airlines from Condition No. 11 in its amended certificate for route No. 73, insofar as it requires that the intermediate point Alamosa-Monte Vista, Colo., on segment 4 be served through a single airport, through Feb. 11, 1952. (Dec. 10.)

E-5941 denies application of National Airlines for an exemption under section 416(b) of the Act so as to permit it to serve both Washington, D. C., and Norfolk, Va., on the

(Continued on Page 19)

Scheduled Air Carrier Operations

(Continued on Page 21)

International and Overseas: January-November, 1951, 1950

Operator	Revenue miles January-November		Revenue passengers January-November		Revenue passenger miles (000) January-November		Passenger seat miles (000) January-November		Revenue passenger load factor (percent) January-November	
	1951	1950	1951	1950	1951	1950	1951	1950	1951	1950
American Airlines	2,612,784	2,082,333	106,370	81,880	79,227	62,481	133,548	102,673	59.32	60.81
American Overseas Airlines (ceased opr. 9 26 50)	—	4,808,057	—	105,823	—	160,108	—	242,038	—	65.15
Braniff Airways	3,086,143	2,360,542	27,223	18,589	57,227	38,980	133,576	101,512	42.84	38.35
Chicago & Southern Air Lines	1,532,951	1,742,190	23,894	20,235	28,760	24,778	70,449	69,234	40.82	35.79
Colonial Airlines	730,482	553,258	38,045	21,276	29,803	17,265	37,985	27,478	78.46	62.83
Eastern Air Lines	2,419,173	685,777	51,679	15,179	71,690	15,785	142,580	35,301	50.28	44.72
National Airlines	1,068,371	697,244	103,670	73,613	26,737	19,885	58,765	38,690	45.50	51.40
Northwest Airlines	5,794,498	5,660,986	70,629	49,279	120,442	92,828	208,293	166,481	57.82	55.76
Pan American World Airways:										
Atlantic Division	14,559,462	11,740,599	320,766	169,437	465,496	329,139	714,539	460,519	65.15	71.47
Latin American Division	25,988,624	24,981,165	722,396	637,671	641,484	553,333	1,062,903	902,157	60.35	61.33
Alaska Operations	2,705,883	2,221,705	52,276	40,144	54,641	38,044	120,642	68,988	45.29	55.15
Pacific Operations	8,435,723	8,582,550	75,101	67,814	262,678	205,783	407,103	371,719	64.52	55.36
Pan American-Grace Airways	5,811,628	5,235,154	107,863	90,881	113,835	94,366	196,094	195,108	58.05	48.37
Trans World Airlines	12,207,419	12,783,989	134,163	115,804	334,625	314,025	519,988	510,267	64.35	61.54
United Air Lines	2,828,456	1,928,917	38,542	25,933	95,198	62,488	146,994	99,879	64.76	62.56
Uruba, Medellin & Central Airways	93,808	93,016	2,344	2,387	769	785	1,879	1,589	40.93	49.40
Total	89,445,405	86,157,392	1,874,961	1,535,945	2,382,612	2,029,973	3,955,338	3,393,633	60.24	59.82
Index (1950=100)	103.82	100.00	122.07	100.00	117.37	100.00	116.55	100.00	100.70	100.00

Ton-miles flown

Operator	Express January-November		Freight January-November		United States mail January-November		Parcel post January-November	
	1951	1950	1951	1950	1951	1950	1951	1950
American Airlines	8,883	11,484	1,469,395	1,240,720	145,424	112,236	0	0
American Overseas Airlines (ceased opr. 9 26 50)	—	2,058,699	—	—	—	1,076,291	—	285,557
Braniff Airways	0	0	1,274,278	843,877	162,425	51,364	0	0
Chicago & Southern Air Lines	0	0	595,449	603,763	33,772	25,878	2,060	2,008
Colonial Airlines	0	0	48,351	52,101	16,138	4,181	1,441	973
Eastern Air Lines	0	0	282,876	281,262	349,397	70,786	0	5,249
National Airlines	21,321	125,856	119,661	15,369	12,156	0	0	0
Northwest Airlines	233,884	157,160	6,845,188	5,546,691	1,604,753	1,864,627	0	0
Pan American World Airways:								
Atlantic Division	6,417,994	7,537,094	4,314,468	0	3,861,070	2,545,377	1,000,254	601,518
Latin American Division	9,829,884	19,785,823	12,085,837	0	2,807,406	2,506,468	0	0
Alaska Operations	2,336,137	3,798,325	2,673,765	0	419,128	356,419	0	0
Pacific Operations	3,179,397	5,274,470	3,626,431	0	4,009,451	5,243,450	46,563	0
Pan American-Grace Airways	2,158,974	1,538,948	0	0	819,215	904,079	86,229	31,581
Trans World Airlines	0	0	6,046,365	5,445,571	3,103,144	2,444,649	528,695	416,199
United Air Lines	0	0	466,134	337,218	747,681	545,924	0	0
Uruba, Medellin & Central Airways	28,447	30,569	27,539	0	0	0	0	0
Total	24,209,921	40,268,428	40,034,972	14,470,864	17,594,373	17,163,885	1,660,242	1,343,085
Index (1950=100)	60.12	100.00	276.66	100.00	102.51	100.00	123.61	100.00

Domestic: Passenger Miles Flown (Total revenue and nonrevenue, in thousands)

	January	February	March	April	May	June	July	August	September	October	November	Total
Trunk	744,984	689,234	864,819	865,751	890,976	950,740	946,363	994,477	968,165	954,960	842,324	9,712,793
Feeder	18,080	17,205	22,774	24,014	28,831	31,185	29,799	32,560	29,026	29,172	25,376	288,022
Territorial	3,886	3,613	4,459	3,759	4,727	6,499	7,080	7,985	5,754	5,184	5,221	58,167
Total	766,950	710,052	892,052	893,524	924,534	988,424	983,242	1,035,022	1,002,945	989,316	872,921	10,058,982

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same flight on route No. 31, until final decision of the Board in Docket No. 3546. (Dec. 12.)

E-5942 grants Midet Aviation Corp. exemption to Jan. 3, 1952, from the provisions of Part 291 of the Board's Economic Regulations, and to Dec. 13, 1952, from the provision of section 401(e) of the Act, so as to permit it to engage in regular air transportation of persons and property between Walker Cay, Bahamas, B. W. I., and West Palm Beach, Fla., using multi-engine seaplanes which meet specified requirements. (Dec. 13.)

E-5943 grants the City of Rutland, Vt., leave to intervene in the Wiggins Renewal Investigation case. (Dec. 12.)

E-5944 approves an agreement between Eastern Air Lines and Colonial Airlines relating to lease of Aircraft grants from the provisions of section 408 of the Act, permitting them to carry out the terms of the agreement. (Dec. 13.)

E-5945 orders Pan American World Airways to show cause why the Board should not establish mail rates set forth in an attached statement to be paid Pan American over its routes between the United States and Alaska and between points in Alaska, on and after Jan. 1, 1946. (Dec. 13.)

E-5946 approves, subject to approval by the United States Air Force, agreement for merger of American Air Export and Import Co. and SACECA, Inc., and exempts them from the public hearing requirements of section 408 of the Act insofar as they apply to the agreement. (Dec. 13.)

E-5947 opinion and order amend permit of Compagnie Na-

tionale Air France for a route between Martinique/Guadeloupe and Haiti via Puerto Rico so as to extend the route to Miami, Fla.; issue new permits to Air France to operate between points in France and Mexico, D. F. via stated intermediate points, and between Martinique, and intermediate point on Guadeloupe, and New York, N. Y. Approved by the President December 14. (Nov. 19.)

E-5948 grants American Airlines exemption, effective Dec. 17, 1951, through Dec. 24, 1951, from Title IV of the Act, and the terms, conditions, and limitations of its amended certificate for route No. 4 so as to permit it to engage in air transportation of mail between Los Angeles and San Francisco, Calif., aboard its cargo flights between these points. (Dec. 14.)

E-5949 orders Southern Airways to show cause why the Board should not establish certain temporary rates for the transportation of mail on and after Jan. 1, 1951, over its entire system. (Dec. 13.)

E-5950 opinion and order in the Service to North Central Iowa Community case amend temporary certificate, effective Feb. 10, 1952, of Mid-Continent Airlines for route No. 106 so as to include Mason City as an intermediate point between Fort Dodge and Waterloo; rescind order No. E-5750. (Dec. 13.)

E-5951 opinion and order in the Wisconsin Central Renewal case renew and amend certificate of Wisconsin Central Airlines for route No. 86; suspend until Sept. 30, 1955, certificate of Northwest Airlines for route No. 3, insofar as it authorizes service to Duluth, Minn.-Superior, Wis.; authorize Northwest to suspend service until Sept. 30, 1955, at Eau Claire, Green Bay, and Wausau, Wis.; continue exemption authority of Wisconsin Central to serve Beloit-Janesville, Wis., until 60 days after final decision in the North Central Route Investigation case. (Dec. 13.)

E-5952 opinion and order in the North Central Route Investi-

gation case amend temporary certificate, effective Feb. 11, 1952, of Wisconsin Central Airlines for route No. 26, so as to include a new segment between Chicago, Ill., and Minneapolis-St. Paul, Minn., and of Mid-Continent Airlines for route No. 106, suspending service at stated points; reopens proceeding for further hearing with respect to service between Milwaukee, Wis., and Rockford, Ill., on route No. 106 of Mid-Continent and route No. 107 of Ozark Airlines. (Dec. 13.)

E-5953 grants Conner Air Lines exemption from the provisions of section 401(a) of the Act and Part 290, subject to compliance by Resort Airlines and Conner with terms, conditions, and limitations set forth in Board order E-5480, so as to permit it to perform one southbound flight on behalf of Resort between Miami, Fla., and Kingston, Jamaica, on or about Dec. 17, 1951, carrying laborers between said points. (Dec. 17.)

E-5954 approves certain agreements between Trans-Texas Airways, Pan American World Airways, various other air carriers, and other carriers, relating to intercompany arrangements (Dec. 18.)

E-5955, 56, 57 opinion and order fix and determine final mail rates to be paid Capital Airlines, and Chicago and Southern Air Lines (domestic operations) on and after Oct. 1, 1951, and Robinson Airlines Corporation on and after Sept. 19, 1948. (Dec. 19.)

E-5958 dismisses application of Overseas National Airways for a certificate. (Dec. 20.)

E-5959 approves an agreement involving American Airlines and 25 certificated air carriers relating to the establishment of certain uniform procedures to be used in connection with domestic and international air cargo shipments and a coordinated

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Helpful Publications

Publications listed below are on sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Orders must be accompanied by money order or check made payable to the Superintendent of Documents.

Flight Assistance

Airman's Guide and Flight Information Manual \$6 a year

(The Airman's Guide, published every 2 weeks, contains three sections: Directory of Airports, Radio Facility Data, and Notices to Airmen. The Flight Information Manual supplements the Airman's Guide and is issued semiannually.)

Airports

Airport Buildings 20 cents
(Problems of airport building design are discussed and several solutions suggested.)

Airport Design 30 cents
(Provides basic information on airport construction.)

Airport Landscape Planting 15 cents
(Provides practical information on how to improve the appearance of an airport.)

Airport Turfing 25 cents
(Describes various problems involved and presents methods used in establishing and maintaining a good turf.)

Seaplane Facilities 25 cents
(Answers problems posed by the planning and construction of seaplane bases.)

Small Airports 15 cents
(Answers to many problems confronting communities or individuals who want to build a small airport.)

Standard Specifications for Construction of Airports \$2.25

(Contains specification items for construction of airports and air parks. Covers clearing and grubbing, grading, drainage, paving, lighting, turfing, and incidental construction.)

Flight Training

Aircraft Powerplant Handbook \$1.50
(For students, mechanics, pilots, and engineers who have only superficial knowledge of aircraft powerplant fundamentals.)

Facts of Flight 50 cents
(A nontechnical manual, with chapters on airplane flight, stalls, spins, airplane structure, airplane engines, flying the plane, airport traffic, seaplanes, and safety in flight.)

Flight Instruction Manual \$1.50
(A complete text on flight training for student and instructor. Includes acrobatic maneuvers.)

Path of Flight 75 cents
(Practical information about basic navigation of aircraft, presented in brief form for the use of the private pilot.)

Questions and Answers for Private Pilots 15 cents
(A collection of the questions and answers upon which the private pilot written examination is based.)

Realm of Flight 60 cents
(Presents practical information about the effect of atmospheric conditions upon flight.)

Personal Aircraft Inspection Manual 55 cents
(Contains information dealing with the fundamentals of inspection and provides a general maintenance guide for the owners of personal type aircraft.)

Miscellaneous

ANC Procedures for the Control of Air Traffic 45 cents

(Officially approved manual of air traffic control procedures adopted for use by civil and military air traffic control personnel. These procedures are required to be followed by all civil controllers holding certificates under Part 26 of the CAR.)

Personal Aircraft Owner's Guide 15 cents
(A collection of the questions most frequently asked by the owners of personal aircraft.)

Terrain Flying 25 cents
(Describes the special problems and hazards encountered in flying over various kinds of terrain and proper precautions.)

The Air Fair 20 cents
(Gives detailed helps in planning and operating an air fair.)

The Flying Club 15 cents
(Planning and organization material so arranged as to permit "tailoring" to fit local conditions.)

Scheduled Air Carrier Operations

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Domestic: January-November 1951, 1950

Operator	Revenue miles January-November		Revenue passengers January-November		Revenue passenger miles (000) January-November		Passenger seat miles (000) January-November	
	1951	1950	1951	1950	1951	1950	1951	1950
Trunk Lines								
American Airlines	68,137,933	52,960,149	4,490,614	3,174,671	2,266,959	1,583,443	3,018,382	2,281,477
Braniff Airways	10,720,862	10,255,242	710,632	583,955	245,320	196,483	378,861	358,200
Capital Airlines	23,176,262	18,947,616	1,797,106	1,248,752	558,791	371,718	914,739	692,383
Chicago & Southern Air Lines	7,744,788	6,772,372	416,680	300,955	154,290	106,508	243,915	190,632
Colonial Airlines	3,551,202	3,159,624	227,007	176,887	57,568	45,520	106,320	91,541
Continental Air Lines	6,007,348	5,315,626	258,460	186,539	95,727	65,221	179,361	150,367
Delta Air Lines	14,982,560	13,044,772	806,546	578,795	366,041	252,960	543,140	435,195
Eastern Air Lines	51,282,020	47,623,877	3,178,089	2,394,432	1,426,994	1,113,378	2,186,305	1,801,127
Inland Air Lines	2,575,082	2,820,801	91,591	83,790	37,178	32,913	62,405	62,967
Mid-Continent Airlines	7,685,709	7,586,246	362,827	316,992	111,085	93,588	192,012	176,703
National Airlines	13,790,690	10,299,357	561,502	350,802	361,672	216,726	568,275	409,133
Northeast Airlines	1,377,838	3,853,444	424,182	349,202	81,604	64,927	133,006	124,738
Northwest Airlines	11,418,764	18,333,297	662,632	753,188	436,357	478,857	659,810	838,257
Trans World Airlines	45,441,119	41,751,649	1,925,183	1,431,923	1,389,798	1,007,345	1,817,798	1,528,214
United Air Lines	52,810,664	48,858,688	2,611,115	2,272,878	1,588,496	1,294,821	2,096,907	1,869,794
Western Air Lines	7,800,373	7,545,903	519,819	414,984	198,606	157,129	300,984	287,196
Trunk Total	331,503,214	299,128,663	19,043,385	14,612,735	9,376,426	7,081,564	13,402,220	11,297,964
Index (1950=100)	110.82	100.00	130.32	100.00	132.41	100.00	118.63	100.00
Feeder Lines								
All American Airways	3,013,161	2,845,341	198,084	139,758	27,984	19,755	63,277	59,748
Bonanza Air Lines	838,328	828,888	27,346	17,063	6,975	4,135	17,178	16,659
Central Airlines	1,282,702	1,662,241	30,886	9,479	4,130	1,107	24,735	5,668
Emp re Air Lines	1,135,849	1,067,080	41,001	41,763	7,908	7,689	23,851	22,497
Frontier Airlines	4,121,821	3,391,190	93,895	58,998	25,101	15,802	83,195	65,691
Helicopter Air Service	299,494	301,978	0	0	0	0	0	0
Lake Central Airlines	1,073,849	805,180	28,454	11,204	4,663	1,776	22,275	11,022
Los Angeles Airways	272,762	309,144	0	0	0	0	0	0
Mid-Continent Airlines	869,320	141,302	38,789	5,660	7,964	1,228	18,347	2,967
Mid-West Airlines	718,009	1,422,115	2,532	6,527	377	947	2,872	5,686
Ozark Air Lines	1,844,802	108,607	44,780	2,660	7,233	392	37,402	1,929
Piedmont Aviation	3,805,885	3,359,994	174,172	112,069	40,225	23,226	79,925	70,560
Pioneer Air Lines	3,577,634	3,412,966	148,702	117,107	38,632	31,477	85,862	82,025
Robinson Airlines	1,375,222	1,085,628	92,973	50,811	14,417	8,115	28,340	21,433
Southern Airways	2,739,644	1,644,572	87,904	33,161	15,575	5,703	57,479	34,502
Southwest Airlines	2,252,637	2,127,578	126,482	109,462	24,633	20,420	47,317	44,680
Trans-Texas Airways	2,646,656	2,773,971	69,634	58,160	15,910	13,160	55,579	58,160
West Coast Airlines	1,216,408	1,132,618	71,752	62,531	10,635	8,907	25,544	23,785
Wiggins, E. W. Airways	495,858	408,043	3,901	2,884	362	261	1,941	1,626
Wisconsin-Central Airlines	1,838,030	1,880,071	89,843	45,161	14,290	7,191	33,295	15,563
Feeder Total	35,418,071	30,708,507	1,371,130	884,428	267,014	171,291	708,414	544,111
Index (1950=100)	115.34	100.00	155.03	100.00	155.88	100.00	130.20	100.00
Territorial Lines								
Caribbean-Atlantic Airlines	558,119	504,828	85,237	66,538	6,821	5,349	15,144	12,787
Hawaiian Airlines	2,984,798	2,698,065	313,793	298,689	40,688	38,668	64,245	59,496
Trans-Pacific Airlines	734,556	76,020	76,020	9,391	9,391	—	20,567	—
Territorial Total	4,277,473	3,202,893	475,050	365,227	56,900	44,017	99,956	72,283
Index (1950=100)	133.55	100.00	130.07	100.00	129.27	100.00	138.28	100.00
Grand Total	371,198,758	333,040,063	20,889,565	15,862,390	9,700,340	7,296,872	14,210,590	11,914,358
Index (1950=100)	111.46	100.00	131.69	100.00	132.94	100.00	119.27	100.00

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air cargo system. (Dec. 20.)

E-5960 orders Pacific Northern Airlines, Inc. to show cause why the Board should not establish certain temporary rates for the transportation of mail on and after Oct. 1, 1951, over its intra-Alaska and U. S.-Alaska routes. (Dec. 20.)

E-5961 denies application of Chicago and Southern Air Lines for an exemption authorizing it to suspend service at Greenwood, Miss., on its route No. 8, and the inclusion of said city as an intermediate point on route No. 98. (Dec. 20.)

E-5962 dismisses application of Nationwide Air Transport Services, Inc., for certificate, exemptions, and reconsideration of order No. E-4182 which denied an application for extension of temporary decision. (Dec. 20.)

E-5963 grants the Department of Justice leave to intervene in the matter of the complaint of Bohrer Air Freight Co., and Airport Package Service, Inc., with respect to proposed rules relating to advance charges to certain local cartage operators. (Dec. 20.)

E-5964 extends for 6 months, temporary exemption granted Continental Air Lines by order No. E-4077 as amended and extended by orders Nos. E-4800 and E-5317, so as to permit it to furnish free interstate transportation to technical employees of specified companies for technical in-flight observation. (Dec. 21.)

E-5965 grants Riddle Aviation Company an exemption from the provisions of section 401 (a) of the Act and Part 295 of the Economic regulations so as to permit it to transport, at the expense of the shipper, one or more attendants with each shipment of live animals, birds, and reptiles when necessary for the protection of the shipment, other cargo or the aircraft and crew, effective so long as Riddle's letter of registration No. C-20 or its certificate for route No. 109 remains in effect. (Dec. 21.)

The Board announced last month the publication of its 1950 airline traffic survey and its availability on a sales basis from the U. S. Government Printing Office.

The five-volume survey, entitled "Origination-Destination Airline Traffic Survey for March, 1950," includes detailed traffic data covering domestic, territorial, and international service of the United States carriers. The prices and contents of the first four volumes, which comprise the domestic section, are: Volume 1, Summary—20 cents; Volume 2, Aberdeen through Hannibal—\$1.75; Volume 3, Harlingen through Pueblo—\$1.75; and Volume 4, Pullman through Zanesville (including transborder by U. S. and Canadian base stations)—\$1.50. The international section is contained in Volume 5 and sells for \$1.25.

E-5966 grants the Town of Norwood, Mass., and the City of New Haven, Conn., leave to intervene in the *Wiggins Renewal Investigation* case. (Dec. 21.)

E-5967 grants the County of Oneida, N. Y., leave to intervene in the matter of the application of Robinson Airlines Corporation for renewal of its certificate for route No. 94. (Dec. 21.)

Scheduled Air Carrier Operations

(Continued from Page 20)

Domestic: January-November 1951, 1950

Operator	Revenue passenger load factor (percent)		Ton-miles flown					
	January-November		Express January-November		Freight January-November		United States mail January-November	
	1951	1950	1951	1950	1951	1950	1951	1950
Trunk Lines								
American Airlines	75.11	69.40	8,066,085	6,402,437	31,926,956	31,629,434	13,231,436	8,676,794
Branch Airways	64.75	54.85	952,431	924,166	1,850,739	1,780,120	1,365,642	1,149,123
Capital Airlines	61.09	53.69	2,365,759	2,055,236	4,795,965	7,641,904	1,755,414	1,336,113
Chicago & Southern Air Lines	63.23	55.86	696,193	643,808	769,309	812,580	599,014	532,863
Colonial Airlines	54.15	49.73	81,636	74,970	102,381	97,638	97,106	83,329
Continental Air Lines	53.37	43.37	142,869	93,656	527,346	445,122	338,250	179,144
Delta Air Lines	67.39	58.13	1,078,819	937,332	3,264,705	2,806,033	1,523,902	1,074,120
Eastern Air Lines	65.27	61.82	4,501,255	3,768,215	4,849,796	9,524,841	4,991,324	4,404,000
Inland Air Lines	59.58	52.27	83,348	62,885	130,357	150,290	181,735	113,874
Mid-Continent Airlines	57.85	52.96	245,951	213,356	470,953	464,447	387,801	290,530
National Airlines	63.64	52.97	406,775	481,202	4,581,327	2,666,919	974,529	585,040
Northeast Airlines	61.35	52.04	172,788	161,970	229,950	273,953	137,526	104,941
Northwest Airlines	66.13	57.13	1,620,400	1,837,611	3,467,415	6,402,679	1,945,420	2,240,211
Trans World Airlines	76.46	65.92	6,871,313	5,432,474	13,604,483	12,211,018	10,570,783	7,903,247
United Air Lines	75.75	69.25	9,034,045	7,842,646	20,551,717	25,572,148	15,760,950	10,675,417
Western Air Lines	65.99	59.71	395,365	456,474	558,471	639,073	1,100,804	734,243
Trunk Total	69.96	62.68	36,715,032	31,388,438	91,681,870	103,118,199	54,961,636	40,082,989
Index (1950=100)	111.61	100.00	116.97	100.00	88.91	100.00	137.12	100.00
Feeder Lines								
All American Airways	44.22	33.06	138,167	104,186	0	0	53,529	37,540
Bonanza Air Lines	40.60	24.82	2,687	1,796	14,976	8,590	5,900	4,759
Central Airlines	16.70	19.53	5,076	0	8,905	0	20,026	14,274
Empire Air Lines	33.16	34.32	17,178	16,837	0	0	21,915	17,866
Frontier Airlines	30.17	24.06	69,832	49,297	278,384	148,921	115,095	62,116
Helicopter Air Service	—	—	—	—	—	—	—	—
Lake Central Airlines	20.93	16.11	81,911	32,008	0	0	22,496	18,317
Los Angeles Airways	—	—	—	—	—	—	—	—
Mid-Continent Airlines	43.41	41.39	40,476	4,972	36,666	7,551	19,515	2,737
Mid-West Airlines	13.13	16.65	0	0	0	0	8,743	16,503
Ozark Air Lines	19.34	20.32	55,635	2,737	0	0	19,706	1,981
Piedmont Aviation	50.33	32.92	79,358	73,855	113,848	122,674	58,848	46,154
Pioneer Air Lines	44.99	38.37	39,846	42,964	140,520	124,437	96,290	87,330
Robinson Airlines	50.87	37.86	57,065	37,895	36,590	32,657	25,580	20,335
Southern Airways	27.10	16.53	71,223	38,124	0	0	76,859	40,334
Southwest Airlines	52.06	45.70	42,905	43,679	119,382	118,218	54,353	41,471
Trans-Texas Airways	28.63	22.63	26,523	27,202	58,898	54,418	44,843	47,598
West Coast Airlines	41.63	37.45	9,853	10,815	33,153	13,598	9,662	6,576
Wiggins, E. W. Airways	18.65	16.05	1,625	0	0	0	1,260	1,554
Wisconsin-Central Airlines	42.92	46.21	99,536	43,902	0	0	53,545	35,880
Feeder Total	37.69	31.48	838,896	530,264	841,327	631,064	763,550	547,066
Index (1950=100)	119.73	100.00	158.20	100.00	133.32	100.00	139.57	100.00
Territorial Lines								
Caribbean-Atlantic Airlines	45.04	41.83	0	0	21,904	23,750	9,212	8,935
Hawaiian Airlines	63.33	64.99	88,909	106,810	726,955	434,862	31,462	48,002
Trans-Pacific Airlines	45.66	—	1,265	—	15,370	—	8,289	—
Territorial Total	56.93	60.90	90,174	106,810	764,229	458,612	48,963	56,937
Index (1950=100)	93.48	100.00	84.42	100.00	166.64	100.00	86.00	100.00
Grand Total	68.26	61.24	37,644,102	32,025,512	93,287,426	104,207,875	55,774,149	40,686,992
Index (1950=100)	114.46	100.00	117.54	100.00	89.52	100.00	137.08	100.00

Civil Aviation Highlights

	1951	1950
Airports and airfields recorded with		
By type: December 31		
Commercial	2,042	2,329
Municipal	2,316	2,272
CAA Intermediate	57	76
Military	346	331
All others	1,476	1,395
a. Private	1,331	1,244
b. Miscellaneous government	145	151
Civil airports and airfields by class:		
Total	5,891	6,072
Class I and under	3,838	4,005
Class II	960	964
Class III	507	507
Class IV	375	376
Class V	129	139
Class VI and over	82	81
Total U. S. civil aircraft	88,545	92,809
Scheduled air carrier aircraft		
December 31		
Total	1,253	1,220
1- and 2-place models	162	242
3-, 4-, and 5-place models	133	64
Over 5-place models	151	151
Certificates approved	29	27
November		
Student pilots	(9)	2,980
Private pilots	(9)	1,789
Commercial pilots	(9)	339
Airline transport pilots	(9)	71
Mechanics (original certificates)	(9)	40
Ground instructors (original certificates)	(9)	59
Flight instructor ratings	(9)	114
Instrument ratings	(9)	87
Control tower operators	(9)	55
Traffic control activity: November		
Aircraft operations, CAA airport towers	1,250,008	1,140,638
Fix postings, CAA airport centers	1,188,184	941,499
Instrument approaches, CAA approach control towers	30,102	21,784
AIRPORT OPERATIONS		
Washington National: December		
Scheduled air carrier:		
Passengers departing	94,221	81,505
Passengers arriving	89,728	76,395
Aircraft arrivals and departures	11,839	10,394
Other aircraft arrivals and departures	2,235	2,708
San Francisco Municipal: November		
Scheduled air carrier:		
Passengers departing	62,546	47,514
Passengers arriving	60,727	47,604
Aircraft arrivals and departures	8,005	6,883
Other aircraft arrivals and departures	2,815	2,587
Oakland Municipal: November		
Scheduled air carrier:		
Passengers departing	9,073	8,191
Passengers arriving	10,350	8,376
Aircraft arrivals and departures	5,405	4,648
Other aircraft arrivals and departures	7,657	6,843
Miami International: November		
Scheduled air carrier:		
Passengers departing	55,100	44,752
Passengers arriving	59,779	47,405
Aircraft arrivals and departures	7,808	8,462
Other aircraft arrivals and departures	13,398	7,975
Los Angeles International: November		
Scheduled air carrier:		
Passengers departing	70,641	53,248
Passengers arriving	78,084	54,045
Aircraft arrivals and departures	9,791	7,564
Other aircraft arrivals and departures	7,385	5,388

¹ Airport type definitions: Commercial—Public use and public services, private control. Municipal—Public use and public services, public control. CAA Intermediate—No public services, CAA control. Military—No public services, military control. Other—(a) No public services, private control (b) No public services, Federal Government control (Forest Service, etc.)

² The following is a breakdown of paved airports and unpaved airfields by class:

Class of Facility	Airports		Airfields		Total	
	1951	1950	1951	1950	1951	1950
I and under	124	108	3,714	3,897	3,838	4,005
II	184	158	776	806	960	964
III	343	332	164	175	507	507
IV	333	336	42	40	375	376
V	123	131	6	8	129	139
VI and over	78	78	4	3	82	81
Totals	1,185	1,143	4,706	4,929	5,891	6,072

³ Not available.

Work of Prototype Group in Report to Congress

(Continued from Page 13)

or the government, of new types of civil transport aircraft; and should revise the Technical Subcommittee's tentative specifications to provide for longer range for jet-powered aircraft.

England and Canada Ahead.—The subcommittee concluded that the British are "considerably ahead" of the U. S. in turbine-powered civil transports and that Canada also is ahead. The U. S. however, with certain advantages it enjoys in quantity production, can overhaul the 3- to 5-year lead which the British have if it immediately starts its testing and initiates development of new types, they said.

In adopting tentative specifications for aircraft which it considers are needed today, the committee drafted specifications for a cargo transport of 30,000 pounds payload, a cargo transport of 50,000 pounds payload, and a jet-passenger transport, proposing that in the testing of newly developed advanced aircraft, cargo planes have first priority, the feeder-line aircraft second and the medium and long-haul

passenger transports third priority.

B-45's Available for testing.—Testing of these planes would be done by placing planes in simulated airline operation, in order to obtain information essential to adapting such planes to commercial service. The Air Force informed the CAA it would make two of its jet-bombers, B-45's, available for such use, and the committee proposed to the CAA that it ask for \$600,000 for such testing. The Administrator's request for the appropriation of funds for this phase of the testing program was denied by Congress. These funds would have come out of the \$12,500,000 which Congress had approved in the bill but had not appropriated.

The committee decided that advanced aircraft already under development should be eligible for assistance under the program and that the question of testing unconventional, short-haul aircraft such as helicopters and small-field, fixed-wing aircraft should be left open, subject to further exploration of their developmental status.

Air Regulations and Manuals February 1, 1952

TITLE	NO.	Civil Air Regulations				1 Civil Aeronautics Manuals			
		Price	Date	Amend-ments	Special Regulations	Price	Date	Supple-ments	Amending Releases
AIRCRAFT									
Certification, Identification, and Marking of Aircraft and Related Products	1	\$0.05	1/15/51	1		\$0.10	8/ 1/46		
Production Certificates	02								
Airplane Airworthiness; Normal, Utility, Aerobatic, and Restricted Purpose Categories	13	.15	11/ 1/49	7	358			7	193, 202
Airplane Airworthiness	04					(2)	7/ 1/44		
Airplane Airworthiness	4a	.20	4/ 7/50		358, 375				
Airplane Airworthiness; Transport Categories	4b	.25	7/20/50	6	358, 361, 370			6	
Glider Airworthiness	5	.05	3/ 5/52						
Rotorcraft Airworthiness	6	.10	1/15/51	1	358			1	
Aircraft Airworthiness; Restricted Category	8	.05	10/11/50						
Aircraft Airworthiness; Limited Category	9	.05	11/11/49	1		.50	1/ 1/51	1	
Aircraft Engine Airworthiness	13	.05	3/ 5/52		358				
Aircraft Propeller Airworthiness	14	.05	3/ 5/52		358	.15	5/ 1/46		
Aircraft Radio Equipment Airworthiness	16	.05	2/13/41			Free	2/13/41		62, 272
Maintenance, Repair, and Alteration of Certified Aircraft and of Aircraft Engines, Propellers, and Instruments	18	.05	8/15/49		377	1.25	8/ 1/49	1	
AIRMEN									
Pilot Certificates	20	.05	8/ 1/49	10				1	
Airline Transport Pilot Rating	21	.05	8/15/49	3					
Lighter-than-air Pilot Certificates	22	.05	11/ 1/49	6					
Mechanic Certificates	24	.05	9/ 1/49	5	365			1	
Parachute Rigger Certificates	25	.05	9/ 5/50	2					
Air-traffic Control-tower Operator Certificates	26	.05	11/ 1/49	5				4	
Aircraft Dispatcher Certificates	27	.05	11/ 1/49	4				2	
Physical Standards for Airmen	29	.05	10/ 1/49	2					
Flight Radio Operator Certificates	33	.05	2/15/50	5				3	
Flight Navigator Certificates	34	.05	11/ 1/49	4				2	
Flight Engineer Certificates	35	.05	11/ 1/49	4				2	
OPERATION RULES									
Air Carrier Operating Certification	40	.05	9/ 1/49		356, 363, 366, 367, 369, 378			6	
Certification and Operation Rules for Scheduled Air Carrier Operations Outside the Continental Limits of the United States	41	.05	11/15/49	5	356, 367, 372			12	
Irregular Air Carrier and Off-Route Rules	42	.10	6/ 1/49	10	367, 368, 375, 378, 379	1.00	9/ 1/49	3	
General Operation Rules	43	.05	8/ 1/49	7				2	
Foreign Air Carrier Regulations	44	.05	9/ 1/49					1	
Commercial Operator Certification and Operation Rules	45	.05	11/15/49	1	356, 367, 375				
Operation of Moored Balloons	48	.05	9/ 1/49						
Transportation of Explosives and Other Dangerous Articles	49	.10	7/20/49						
AIR AGENCIES									
Airman Agency Certificates	50	.05	10/ 1/49	4		.50	8/-/51		
Ground Instructor Rating	51	.05	10/10/49	2				1	
Repair Station Rating	52	.05	10/15/49						
Mechanic School Rating	53	.05	10/15/49			Free	5/-/40	1	
Parachute Loft Certificates and Ratings	54	.05	10/15/49	1		.15	7/ 1/48		
AIR NAVIGATION									
Air Traffic Rules	60	.10	8/ 1/49					.6	
Scheduled Air Carrier Rules	61	.10	9/ 1/49	6	356, 363, 366, 367, 368			9	
Notice and Reports of Aircraft Accidents and Missing Aircraft	62	.05	5/ 1/49						

NOTE: Items for which a price is listed may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Remittances should be made by check or money order payable to the Superintendent. Amendments and Special Regulations may be obtained from the Publications Section, Civil Aeronautics Board, Washington 25, D. C. Free Manuals, Supplements and Releases are available from the Office of Aviation Information, Civil Aeronautics Administration, Washington 25, D. C.

¹ Pending publication of a complete Manual, supplements containing rules, policies, and interpretations of the CAR's will be issued in the form of pages for a Manual and will be available free of charge until release of the Manual.

² Certain aircraft may comply with the provisions of this Part or Part 4a.

³ Out of print.

1951 Edition of ANC-5 Available

The June 1951 edition of ANC-5, "Strength of Aircraft Elements," prepared by the Sub-committee on Air Force-Navy-Civil Aircraft Design Criteria of the Munitions Board Aircraft Committee, is now available from the Government Printing Office at 55 cents per copy.

The material contained in the old edition has been revised and new material has been added to bring the publication up to date with the latest available test data. In addition, certain of the data which were not being used extensively by the industry have been deleted and several changes in format have been effected to facilitate use of the document.

The major differences between the 1951 edition and the previous edition include a rewritten section on fusion welding of steel and the insertion of new allowables for weld metal, and the addition of nondimensional material correction charts for several magnesium alloy extrusion and sheet materials, a table of static yield strengths for AN standard control pulley (steel), and curves covering the reduction in parent metal strength for spot welding steel and aluminum, together with a qualifying statement appended to the tables of minimum edge distances.

Wisconsin Central

(Continued from Page 15)

until final action is taken on the proposed suspension. The Michigan-Wisconsin Service case which is now before the Board for decision, involves applications by Nationwide Airlines, Lake Central Airlines, and Wisconsin Central Airlines to provide service which would connect points in the upper peninsula of Michigan with other portions of the State.

Dissenting Opinion.—Donald W. Nyrop, Chairman, concurred in the extension of Wisconsin Central's operating authority but dissented against the extensive new route authorizations northwest of Twin Cities to Fargo and Grand Forks, North Dakota, on the ground that the cost involved is not commensurate with the public benefits which will accrue from the services thus established.

Josh Lee, Member, dissented from that portion of the decision which defers the question of renewal of the decision which defers the question of renewal of Wisconsin Central's upper Michigan Peninsula route segment and the question of direct service between upper and lower Michigan. It is Mr. Lee's view that the public convenience and necessity require the renewal of Wisconsin Central's upper Michigan Penin-

A. D. Summary Placed on Sale

CAA's annual Airworthiness Directive Summary hereafter will be sold through the Government Printing Office, according to Charles F. Horne, Administrator of Civil Aeronautics.

The 1952 Summary, which is expected to come off the press next month, will be available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at \$1.50 per copy. The purchase price will cover annual revisions of the index for as many issues as the price will permit, this depending on the trend in printing costs.

The bi-weekly Airworthiness Directives will be distributed free, as in the past.

Placing the annual Summary on sale is in keeping with the Department of Commerce policy of eliminating large-scale free distribution of departmental publications, the Administrator said.

sula segment, that Wisconsin Central should be authorized to provide service between upper and lower Michigan, and that these services should be authorized immediately.

Knowledge of Cause of Wear and Tear

Vital to Personal Plane Maintenance

Attrition may be defined as the general wear and tear of an aircraft during its normal life. The five basic weapons or forces employed by attrition are: Weather, Friction, Overloads, Heat, and Vibration. These forces reveal themselves in many ways and affect the entire structure of the aircraft during its normal life. It is important that the person making the inspection be familiar with the effects of these forces from an inspection standpoint. In the following, we will discuss these forces and the part proper inspection plays in arresting their destructive development.

Effects of Weather.—By weather, we mean the local conditions of heat, humidity, rain, wind, snow, etc. Each element or combination of elements has its own peculiar effect upon the normal life of the airplane.

Oxidation. This is a condition caused by the chemical union of metal coming in contact with oxygen in a damp atmosphere. We refer to oxidation as rusting when speaking of steel or iron parts. The oxidation of copper, aluminum, dural, etc. is usually known as corrosion.

Rusting may be prevented or retarded by applying a protective coating to all steel parts. Usually this is accomplished by the application of a high-grade oil base or zinc base paint. Electrolytic plating is another method by which protective coatings are applied. In either case the important point is that the coating keeps the bare metal from coming in contact with the atmosphere.

Corrosion of aluminum or dural surfaces is usually caused by a failure of the protective plating which permits oxidation. Corrosion can also be caused by the paint coming in contact with an eroding chemical such as battery acid, insecticide spray, etc. Contact between two dissimilar metals is still another cause of corrosion.

Atmospheric Moisture. When the air is hot and moist, we refer to it as being humid. Dampness is the term we use to describe low-temperature air, laden with moisture. Both of these conditions are ideal for destructive oxidation. We spoke above of the effect of weather on metal parts. Atmospheric moisture can also harm wood and fabric.

Fabric surfaces and wood structures, if improperly protected, also fall prey to humidity and dampness and become subject to rotting or decay. Decay can be described as a disintegration of a wood substance due to the action of wood-destroying fungi. While the term "decay" generally refers to wood, it can also refer to fabric.

Decay of Wood Structure. Whenever the protective coating of a wood structure fails, decay can set in. This coating usually consists of a varnish treatment or varnish and some type of enamel paint. Aircraft plywood is susceptible to decay especially at the ends of the lamination. Moisture can affect glued joints to the extent that the lamination separates. The thin veneer will then decay rapidly.

Decay of Fabric. Decay of fabric is somewhat similar to that of wood. Fabric, if left exposed to the elements, soon absorbs moisture and other harmful substances. For protection the fabric is given applications of a liquid known as "dope." Dope is usually made from a nitro-cellulose base and when properly applied acts as a tautener to the fabric in addition to producing a hard, smooth, opaque finish. In time, this finish becomes brittle and will develop cracks which will then expose the bare fabric to the harmful effects of actinic sun rays, dirt, oil, and mildew. A gradual reduction of the fabric strength takes place to the point where it no longer maintains a value that is considered airworthy.

Friction.—Friction is described as the resistance to relative motion of two bodies in contact. Like any

machine, the airplane in motion develops friction in hundreds of small moving parts. The effect of friction, on the aircraft and its components, is known as wear. We cannot prevent wear but we can take steps to defer its ultimate effects on the airworthiness of the aircraft by proper lubrication and alignment of moving parts. To better understand inspection techniques, we will briefly discuss the terms used to describe the various conditions of wear or friction.

Inspection Manual

The accompanying article is an excerpt from CAA's Technical Manual No. 101, "Personal Aircraft Inspection Manual." This manual, intended primarily for use by student mechanics, pilots, and personal aircraft owners, is an extensively illustrated general guide for inspection of personal aircraft.

The "Personal Aircraft Inspection Manual" is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 55 cents per copy.

Galling. A characteristic of materials which causes them to seize when brought into intimate contact with each other. The material which is subject to galling is one which will seize or "freeze" when under friction or pressure and with no lubricant it is brought into close contact with a like material.

Abrasion. A form of wear usually caused by the presence of gritty particles between parts in friction. **Chafing.** Wear between two parts caused by the rubbing or sliding of one on the other.

Cutting. Friction of a relatively sharp part on the surface of another part causing a deep indentation or groove.

Elongation. With respect to wear, a combination of friction and impact which tends to cause the bearing area of the moving part to become oval.

Overloads.—Personal aircraft are well designed to absorb the loads imposed during normal operation. When these loads are exceeded, however, the affected part usually becomes deformed. Deformation of a part ordinarily is visible. Therefore, it is a good indication that the part or attached structure has been seriously weakened. This deformation may be slight or very serious. In any case, it can be detected and classified by certain appearances peculiar to the type of overload that was applied.

Types of Overloads.—**Tension.** In tension, a load is applied at either or both ends of the item, tending to pull it apart. Welds are more subject to failure in tension than under any other condition of loading.

Compression. A part that has been subjected to

a compression overload tends to bulge at the center in a direction ninety degrees to the applied load. In the case of tubing, a definite swelling at either extreme of the tube can be felt. In a wood member, a slight ridge is formed at right angles to the applied loads.

Bending. A force or combination of forces that will cause a rigid member to curve or bow away from a straight line is known as "bending."

Torsion. A twisting force that tends to turn one end of the part about a longitudinal axis while the other end is held fast or turned in an opposite direction is called "torsion." Soft materials, when subjected to torsional overloads take the appearance of a piece of twisted dough. Rigid parts indicate the same type of overload by a wrinkling or splintering of the terminal ends.

Shearing. A cutting force applied to both sides of a part, but in opposite directions, which tends to cause the severed parts to slide toward each other is called "shearing." The appearance of this type of deformation may be seen when attempting to cut material with a dull pair of shears or scissors.

In the majority of cases, a deformed part, besides losing its required strength, often places overloads on parts of the structure that are attached to it.

Heat.—As a force of attrition, we previously mentioned heat in terms of weather and its effect on the aircraft. At this time, we will discuss briefly the heat generated by the aircraft in operation. The principal source of heat, in this case, is the aircraft's powerplant. From the standpoint of inspection, we are interested in two kinds of heat; namely, direct and indirect.

Indirect Heat. Indirect heat emanates from the operation of the engine proper and is carried off by the action of the air stream passing through the cowling. If the air stream is unable to carry the heat away fast enough, high internal engine temperatures occur with resulting harmful effects to the engine. Excessive indirect heat will also cause failure of accessories and other items of the powerplant assembly.

Direct Heat. The cause of direct heat is exhaust gases. At the same time, there is also indirect heat radiating from the exhaust system components in addition to the hot gases or flame coming from the exhaust outlet. Leaks in the system will allow harmful gases to find their way into the cabin. Severe leaks or failure of exhaust system components can allow the escape of flames with disastrous results.

Vibration.—There are two types of vibration in aircraft operation; namely, noticeable and unnoticeable. Noticeable vibration is caused by either a malfunctioning powerplant or a loosening of the aircraft structure. The unnoticeable vibration is caused by inherent vibration characteristics of the rotating masses in the engine and propeller. It can be induced from aerodynamic causes at or through the propeller. It can also be caused by engine firing impulses. This type of vibration is usually charted by special instruments at the time the aircraft is type certificated by the CAA. Where harmful vibration frequencies are found to be present, it is required that placards be installed that will indicate the operating ranges which must be avoided.

Noticeable vibration should be corrected as soon as discovered for, if allowed to persist, it will cause abnormal wear between certain moving parts of the aircraft and will especially induce fatigue of these and related parts.

Fatigue. Fatigue means the reversal of stresses in a part, the magnitude of which is beyond the parts fatigue limits. Fatigue itself cannot be detected while it is taking place. Its presence is made known only by the ultimate failure of the part. The best preventives for fatigue are to maintain a smoothly running powerplant and the elimination of excessive or abnormal looseness in other components of the aircraft.

CAA Advisory Group Cites Current Needs In "Private Flying"

Development of a prototype of a better personal plane, reduction of the number of accidents due to pilot error, and more active support of civilian pilot and mechanical schools were the action items in the recent meeting of the Aviation Development Advisory Committee of the Civil Aeronautics Administration.

Meeting with seven new members from five different sections of the country, the committee advised Charles F. Horne, CAA's Administrator, to push for the use of federal funds in the development of a personal type plane attractive to more potential users. The Committee pointed out that all prototype funds thus far authorized are designed to test jet-powered transport planes, and urged that Congress be persuaded to allow some of this money for personal plane development.

John T. Griffin, Lexington, Mass., was appointed chairman of a subcommittee consisting of Charles Rose and James Ramsey to report on a specific 5-year program of such development, including estimates of cost.

They also asked the Administrator to push for the adoption of two bills now before Congress which would improve conditions among the nation's airman training schools. One bill consists of enabling legislation for government-sponsored and financed pilot and mechanic training, and the other for flight training in Reserve Officers Training Corps.

Members of the committee approved the educational campaign now under way by the CAA to awaken pilots to the dangers of accidents which can be attributed to pilot error, and they accepted assignments from the Administrator to stage panel discussion type meetings among pilots of all grades with this kind of accident as the subject.

The committee also approved a study for the marking of abandoned airports in such a manner that they would be useful as landmarks and possible places for emergency landings; recommended active U. S. participation in the international soaring contest in Madrid, Spain, in June and July of this year; and requested that an index be printed on aeronautical charts to enable pilots to locate towns more easily.

New members added to the committee this year are: John T. Griffin, East Coast Aviation Corporation, Lexington, Mass.; L. S. White, Aero Credit Corporation, Portland, Ore.; Frank W. Beer, Attorney, Phoenix, Ariz.; Merrill C. Meigs, Hearst Corporation vice president, Chicago, Ill.; Charles J. Rose, Continental Motors, Muskegon, Mich.; Zack Mosely, "Smiling Jack" author and cartoonist, Stuart, Fla.; and John Bennett, Louisville Flying Service, Louisville, Ky.

The other members include Maxwell W. Balfour, Tulsa, Okla.; George W. Haddaway, Dallas, Tex.; W. O. Marsh, Phoenix, Ariz.; James D. Ramsey, Lincoln, Nebr.; and C. J. Reese, Muskegon, Mich. Arthur Godfrey is an honorary member.

CAA Statistical Handbook on Sale

The 1950 edition of the CAA Statistical Handbook of Civil Aviation now is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 50 cents a copy.

The new edition contains all available civil aviation statistics through December of 1950. Statistics pertaining to scheduled air carrier operations are based upon data supplied by the Civil Aeronautics Board.

Mid-Continent Retains Local Service Route

The Civil Aeronautics Board recently announced its decision in the North-Central Route Investigation Case in which it determined not to suspend its prior award of a local service route between Sioux City and Chicago via Fort Dodge, Waterloo, Dubuque, and Rockford to Mid-Continent Airlines, Inc., and granted authority to Wisconsin Central Airlines to provide service between Chicago and the Twin Cities via Beloit-Janesville, Madison, La Crosse, Winona, and Eau Claire.

Mid-Continent Airlines held a certificate authorizing various services of a local nature in the general area bounded by Sioux City, the Twin Cities, and Chicago but had conducted operations only over the Sioux City-Chicago route. The present investigation involved a consideration of whether the carrier should be permitted to inaugurate its service over the remaining portion of the system and whether some other carrier should be substituted for it over the Sioux City-Chicago route.

After considering all of the relevant factors, the Board came to the conclusion that Mid-Continent's operations between Sioux City and Chicago should be continued. Justification was not found for operations by this company between the Twin Cities and Chicago and its certificate between these points was therefore suspended. However, Wisconsin Central was authorized to provide service to the intermediate points previously certificated to Mid-Continent at Winona, La Crosse, and Beloit-Janesville between Twin Cities and Chicago.

The Board also concluded that service should be provided at Clinton, Iowa, and this point was added to the Sioux City-Chicago route of Mid-Continent.

Because of a lack of evidence, action on the segment between Rockford and Milwaukee was deferred and the case reopened for further evidence with respect to the appropriate carrier to provide service between these communities.

Josh Lee, Member, dissented from the action of the Board in retaining Mid-Continent Airlines as the carrier on the Sioux City-Chicago route, taking the position that this is a local service route and should be operated by a local service carrier. Mr. Lee said that there are local service carriers who are fit, willing and able to commence operations immediately and there is no longer any justification for the operation of this route by Mid-Continent.

CAA Urges Caution in Using Higher Lead-Content Fuel

Operators of airline-type engines should be on guard against difficulties likely to be caused by the fuel of higher lead content now prescribed by the Petroleum Administration for Defense, Charles F. Horne, Administrator of Civil Aeronautics, has warned.

The order requires that all commercial aviation gasoline of higher grade than 80 octane, shall contain at least 4.0 ml. (milliliters) of lead per gallon. All such fuel made available for use at foreign bases shall contain at least 4.6 ml. per gallon. An exception is made in the case of 108 to 135 octane fuel which will continue available with the present 3.0 ml. of lead per gallon. All 80 octane fuel will contain at least .50 ml. of lead per gallon.

The mildly leaded 80 octane gasoline will cause no engine difficulties, but operators of many low and medium powered large engines are warned that three adverse conditions may arise: there will be increased deposits from combustion products; there may be increased deposits in oil passages and on the interior surfaces of the engine; there may be increased supercharger and induction system deposits. Op-

Elevator Binding Tape Cause of Near Crash, Say CAB Investigators

The Civil Aeronautics Board announced recently that it has tentatively determined that a steep uncontrolled dive which occurred to a Capital Airlines DC-4 aircraft, flight 805, enroute from Washington, D.C., to Cleveland, Ohio, on January 28, 1952, may have been caused by the sudden stripping of the doped binding tape from the trailing edge of the left elevator in flight. At the time of the incident, flight 805 had by-passed Pittsburgh because of weather and was cruising in smooth air at 6000 feet.

The Board revealed that it had taken immediate action after determining the apparent reason for Flight 805's uncontrolled maneuver so that similar incidents from similar causes could not recur.

After landing at Cleveland without further incident the crew was interrogated by Civil Aeronautics Board safety investigators who reported that the flight maneuver started when the aircraft nosed over suddenly and despite efforts to correct the steep dive with elevator tab control the aircraft continued to noseover as the wheel control column moved forward to its front stop position. The pilot and copilot exerted their combined strength on the aircraft control and brought the ship back in level flight where normal control was resumed. Some 2200 feet of altitude was reported as being lost in the sudden dive, according to the pilots interviewed by CAB.

Controls Functioned Normally.—A thorough examination of the aircraft by CAB safety investigators disclosed that all controls functioned normally and were intact with the exception of the trailing edge of the left elevator. The binding tape, 3 inches in width, is folded over the trailing edge and is doped to the surface, placing 1½ inches of the tape on the top surface and the same amount on the bottom surface. This binding tape had torn loose on the left elevator for 81 inches outboard of the trim tab of the top surface and for a distance of 40 inches on the bottom surface. There remained 41 inches of tape on the bottom surface inboard of the trim tab.

The Board, utilizing the services of the National Advisory Committee for Aeronautics and the Douglas Aircraft Company, manufacturer of the airplane, received computations from these organizations which showed that the binding tape coming loose and ballooning was sufficient to cause a pitching maneuver but that such ballooning of the tape would have to occur almost instantaneously as appeared to be the case in the subject incident.

The Board pointed out that since a failure of this sort could affect not only DC-4 aircraft type, but other large aircraft of any manufacturer, that immediate steps were taken to prevent such a possibility from recurring. The Board has instructed Capital Airlines to complete an examination of their entire fleet in connection with newly installed doped binding tape on aircraft control surfaces, and has also informed the Air Transport Association of its findings. In addition, the Board has discussed the matter thoroughly with the Civil Aeronautics Administration of the Department of Commerce which immediately dispatched a telegram to all CAA regions requesting immediate inspection of all large civil aircraft employing this type of taped trailing edge on control surfaces.

erators were also cautioned not to use fuel that has been stored for a long time under hot conditions because evaporation is likely to have caused a relative increase in its lead content.

The CAA has issued an Aviation Safety Release to warn of these conditions, and to suggest means for avoiding difficulties.

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